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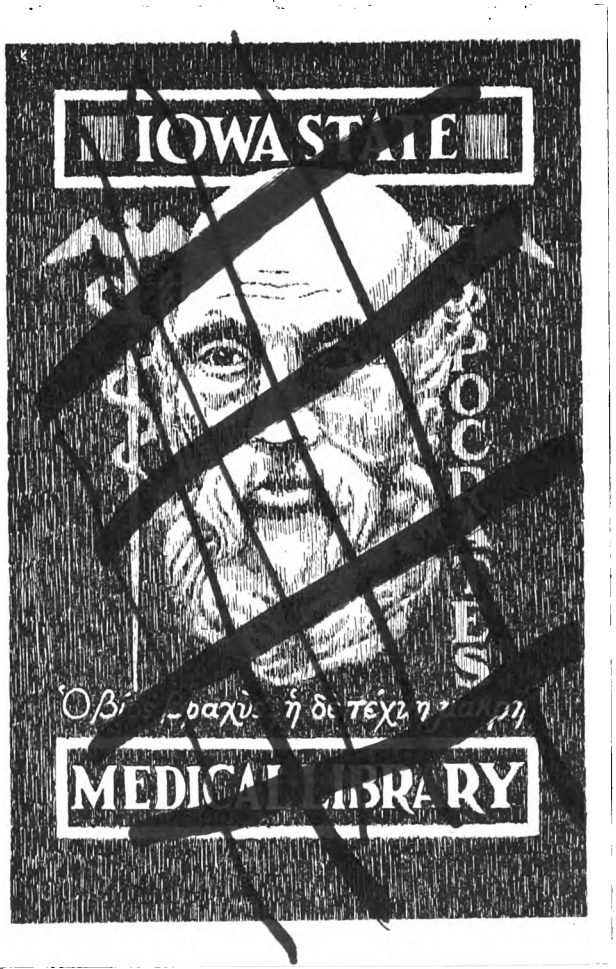

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ORIGINAL ARTICLES

INFLUENZA IN ENGLAND IN 1940–41

C. H. ANDREWES, M.D. LOND., F.R.C.P., F.R.S.
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ACCOUNTS of influenza in England in 1936–37 (Stuart-Harris, Andrewes and Smith 1938) and in 1939 (Stuart-Harris, Smith and Andrewes 1940) have described the clinical features of the outbreaks of those years and the experimental studies then carried out on ferrets and mice. In order to bring the story up to date and to help in ultimately viewing the epidemics of these times in perspective, the following account of experiences in 1940 and 1941 is published.

In 1940.—Circumstances, in particular the absence abroad of the clinical member of our team (C. H. S.-H.), did not permit us to make correlated clinical and pathological studies in the spring of 1940. It may be said, however, that the outbreak of respiratory disease then prevalent in southern England was of the long-drawn-out rather than sharply peaking form, that "clinically typical" influenza was relatively infrequent, and that a tracheo-bronchitis with slow recovery was very prevalent. Garglings from patients diagnosed as clinical influenza were tested by intranasal inoculation of ferrets as in earlier studies. The ferrets were observed for the development of fever or respiratory symptoms, and in many instances subsequently tested for immunity to influenza A virus (Horsfall et al. 1940). No evidence was obtained that that virus was prevalent at all in southern England in 1940. The garglings tested were of the following origins:—

Woolwich	2	tested in	January,	1940.
Cambridge	3	,,	,,	,,
Sherborne	3	,,	,,	,,
London	3 (pooled)	,,	,,	,,
Hampshire	1	,,	,,	,,
London	1	,,	March	,,
,,	3	,,	April	,,
Feltham, Mlsex.	1	,,	May	,,
London	1	,,	September	,,
,,	3 (2 pooled)	,,	November	,,
Wiltshire	2	,,	December	,,

As already mentioned, none of these produced infection in ferrets.

In 1941.—In spite of the absence of any general epidemic in the winter of 1940–41, sporadic cases of clinical influenza occurred in London and elsewhere in southern England. We received during January and February garglings or serum samples from 19 patients diagnosed as clinical influenza; all but 2 came from the London area. As will be shown, 8 of the specimens (42%) provided evidence that the disease was influenza A.

During the same period, a detailed clinical study of the acute respiratory infections occurring in patients admitted to a military hospital in southern England was being made by one of us (C. H. S.-H.). No actual epidemic was observed, but there was a sharply increased incidence of cases in January and February, and many cases presented the clinical picture of influenza as seen in 1937 and 1939. Pathological investigations on 30 cases carried out locally and on material transported to Hampstead showed that 79% of the cases investigated in January and February were examples of virus A influenza. As a number of cases of pneumonia and miscellaneous ailments were included, the actual incidence of virus A infection in cases of clinical influenza in the area was probably even higher. A number of cases of influenza with the signs of bronchiolitis as seen in 1937 (Stuart-Harris et al. 1938) were also seen, and each of the three cases investigated was found to have evidence of influenza virus A infection. It is necessary to emphasise that the military hospital cases were selected only in so far as fever was concerned. They therefore represented the average case of febrile acute respiratory infection during the period stated; the investigations at the military hospital are described in more detail elsewhere (Stuart-Harris 1941).

The higher proportion of positive tests for influenza A virus infection in the group from the military hospital compared with those from London (79%: 42%) may be due to a real difference in the type of respiratory infection in the areas concerned. It may, however, be only apparent, for the material examined from the hospital consisted for the most part of serum samples to be tested for antibodies; that from London comprised chiefly garglings for inoculation into ferrets. As we shall show, the ferret test has proved, more especially this year, to be a far less delicate index of infection than the other.

Specimens from 16 patients from various districts were examined during March and April, 1941; not one gave evidence that influenza A was concerned.

ATTEMPTS TO RECOVER VIRUS IN 1941

Tests on ferrets.—Garglings from 22 patients were inoculated into ferrets between January and early March, 1941. The majority of the ferrets developed fever and symptoms of respiratory infection. Since it was not possible to make serial passages with all material believed to contain virus, some febrile ferrets were allowed to recover, then bled and their antibodies studied. We confirmed earlier findings that no antibodies against the virus occurred in ferrets of our normal stock; accordingly the development of potent neutralising antibodies against influenza A virus in 3 inoculated ferrets was accepted as proof of the presence of A virus in the 3 specimens of garglings used to infect them. In 15 other ferrets fever or symptoms of nasal infection or both appeared, and serial passages were made at intervals of 3 or 4 days; 5 strains proved immunologically to be influenza A virus were thus established. In previous years a strain once adapted to the ferret has been transmissible in series with great regularity; in 1941 less regular results were obtained, occasional ferrets in a series failing to respond with typical fever and symptoms. Furthermore, 7 "strains" were obtained which were apparently capable of propagation for 2, 4, 5, 5, 6, 7 and 9 passages respectively, but eventually "petered out" and were lost. Tests on sera fron recovered ferrets in each of these series showed that no antibodies against influenza viruses A or B were present. The symptoms of upper respiratory tract infection and the fever were, however, typical of influenza in the ferret, though there were rather more "misses" than with the 5 strains which proved to be A. Cultures of turbinate suspensions were made as a routine; some trouble was met with by the picking up of *Pasteurella bronchiseptica*, hæmolytic streptococci and other organisms in the course of ferret to ferret passage, but ferrets receiving culturally-positive material have been excluded from the account just given. On two occasions filtration through a gradocol membrane (average pore diameter 0·7μ) apparently permitted an active agent to pass.

During these investigations those of us doing the ferret tests (C. H. A. and R. E. G.) felt it likely that an agent, probably a virus, had been transmitted to and was being passed through ferrets; but that it could not be securely established in those animals. No conclusive evidence of the correctness of this view was obtained. Suspensions of ferret turbinates containing the supposed agent were passed serially through Swiss mice; with 3 strains passages were made through 5, 5 and 6 mice in series respectively; no virus was recovered. Inoculations of chick embryos amniotically (Burnet 1940a) were equally unsuccessful; filtrates of 6 strains of the series under discussion were used. The queer results obtained in 1941 contrast sharply with those of 1940, when all the material inoculated into ferrets gave unequivocally negative results.

Tests in chick embryos.—As has just been mentioned, Burnet (1940a and b) has lately succeeded in infecting chick embryos by the amniotic route with filtrates of human garglings. Infected embryos showed macroscopic changes in the lungs, or microscopic changes in smears of tracheal exudate; further, many embryos died. After a few passages it was

* Member of the Health Commission to Europe, International Health Division of the Rockefeller Foundation.

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possible to adapt the strains to mice. Such by-passing of the ferret would represent a definite improvement in technique, since ferrets are not easy to work with in the average laboratory. Experience with two of our strains, TAY and BER, obtained early in January, 1941, seemed to confirm Burnet's findings; the changes described by him in tracheal smears of inoculated embryos were seen in one instance in the first chick embryos injected, and material from these chicks infected mice. Unfortunately, the first successes were the only ones; no other virus was induced to infect eggs straight from human garglings, though 21 were tested, 8 of them being certainly from cases of influenza A. In almost every instance at least 3 serial passes were made through chick embryos before the material was abandoned as negative. The loss of virus was confirmed by the negative results of complement-fixation tests (4 strains) or of ferret inoculations (3 strains).

Infection of chick embryos was also attempted with strains which had previously been established in ferrets or mice. Ferret material of the BIR strain produced macroscopic changes in chick embryos at the third passage, and, after one further pass, infected mice; as will be seen later, we failed in two attempts with this strain to infect mice directly from ferret material. In other trials, made in the spring of 1941, filtrates of turbinate suspensions from 4 ferrets infected with the HER, WOR and WES strains of virus gave entirely negative results in chicks, though one (WOR) would infect the chick after previous adaptation to the mouse—a curious contrast to the findings with the BIR virus, which would go from ferret to chick but not directly from ferret to mouse.

Repetition of these attempts in June and July gave rather different results: ferret material of strains HER, WOR and WES was in each case successfully adapted to chicks after a few passes, and thence (HER and WES strains) to the mouse. The ferret material had been kept dried during most of the intervening time, and had only undergone one or two further passages in the ferret. It is probable that greater susceptibility of chick embryos in the summer accounted for the greater success; seasonal differences in the susceptibility of chick embryos have been recorded for ectromelia virus infection by Burnet and Lush (1936).

In positive embryos it was found, as also with well-established strains like PR8, that, at any rate in later passages, an almost constant feature was depletion of the amniotic fluid around the embryo, so that embryos appeared "tied up in knots," often with their feet behind their necks and the membranes closely pressed around them. This finding has been in our experience more constant than anything in lungs or tracheal smears; indeed the changes described by Burnet have been noted only in embryos with the above-described naked-eye appearances. Altogether, the chick-embryo studies have been disappointing; it remains to be seen whether the differences between our findings and Burnet's are due to differences between virus strains or between the eggs or some other, unsuspected, factor.

Work with mice.—In view of our failures in the past, we made no attempts to transmit a virus directly from man to mice. We tried to infect mice with the 5 strains established in ferrets. One (WOR) produced lesions after 4 passes through Swiss mice; this was found immunologically to be closely related to both the GAT and CHR strains of 1937 (Smith and Andrewes 1938). Three others failed to infect Swiss mice after 5 passages in series (MAR strain), 9 passages (WES strain), 5 and 9 passages in two separate trials (HER strain) and 7 passages (BIR strain). The WES and BIR strains were, however, later adapted to mice after being previously grown in chick embryos, as has already been described. It then appeared that the BIR strain was antigenically very like the TAL and CHR strains.

Two other strains (TAY and BER) infected mice after only one and two chick-embryo passages respectively; these were serologically related to our 1937 CHR and TAL viruses. Since 1935, when several viruses were readily induced to pass from the ferret to the mouse, we seem to have encountered progressively greater difficulty in infecting mice with influenza viruses. In 1937 we succeeded with 8 out of 10 strains, obtaining lesions by the 5th or 6th passage, often earlier. In 1939 the results were not very different, and we seemed to be getting over the difficulties in adaptation by using Swiss instead of our own "farm" mice. In 1941 we have failed to adapt a number of strains directly from ferret to mice even when we used Swiss mice.

SEROLOGICAL STUDIES ON HUMAN SERA

Tests against influenza A virus.—As in previous years we have compared the neutralising antibodies in "acute" and convalescent sera, and have taken a five-fold or greater rise in neutralising antibodies against influenza A virus during an illness as evidence of infection with that virus. Table I shows that of 34 pairs of sera from the military hospital taken in January and February the tests on 27 indicated that the patient had suffered from influenza A infection, 7 that the patient's infection was something else; 4 pairs of sera obtained in March and April disclosed no evidence that influenza A was concerned. Only small numbers of sera from other areas were examined (see table II).

TABLE I—RESULT OF TESTS ON MATERIAL FROM MILITARY HOSPITAL; JANUARY AND FEBRUARY, 1941

—	Virus A recovered in ferret test	No virus recovered in ferret test	No test in ferret
"A" infection indicated by serological test ..	1	2	24
Not an "A" infection by serological test ..	0	0 .	7

TABLE II—RESULT OF TESTS ON MATERIAL CHIEFLY FROM LONDON AND NEIGHBOURHOOD; JANUARY AND FEBRUARY, 1941

—	Virus A recovered in ferret test	No virus recovered in ferret test
"A" infection indicated by serological test ..	2	3*
Not an "A" infection by serological test ..	1*	1*
No serological test ..	5	7

* The serological diagnosis was here based on the antibody level in a "convalescent" bleeding only, no "acute" sample being available; the result is thus less dependable than when two specimens could be tested.

Tests against influenza B virus.—Since Francis (1940) described an influenza virus, named B, serologically unrelated to A, we have sought for evidence of its occurrence in England. None of the ferret inoculations carried out in 1941 yielded B virus. Of 8 sera from recovered ferrets, 3 were infected with A and 5 with something other than A; these were tested for antibodies against B virus; but none neutralised. Similarly 11 human sera from patients in Hampshire who failed to show a rise in antibodies against A virus in the course of their illness also gave no indication of infection with influenza B, though a low level of anti-B antibodies was present in all samples. There is thus no evidence that influenza B was prevalent in this country during 1941.

The presence of some antibodies against influenza B virus in human sera is possibly related to the existence of that infection in England in the past. Evidence will be published that some B was present in southern England in 1939.

DISCUSSION

Results shown in tables I and II confirm our previous experience that test of acute and convalescent sera for neutralising antibodies is a far more delicate index of infection than ferret inoculation; 5 patients whose garglings failed to yield virus yet seem to have been examples of influenza A as judged by the serological test. In spite of Burnet's promising findings, the amniotic method of chick inoculation has in our hands given even poorer results than has ferret inoculation.

In 1940 (Stuart-Harris, Smith and Andrewes) it was pointed out that a four-year cycle of major influenza epidemic peaks had been recently prevalent in England. Peaks in 1929, 1933 and 1937 had been interspersed with minor prevalences in 1931, 1935 and 1939 and almost nothing in the years adjacent to the peak years. If the cycle had continued, 1940 should have been a year free from influenza A—and so our laboratory studies indicated; but 1941 should have been a peak year, and this, fortunately, it did not prove, the deaths from influenzal pneumonia in London and the great towns having remained at a fairly low level.

One naturally wonders why no epidemic arrived, why the 1941 virus was so poorly adaptable to the ferret or from the ferret to the mouse, and why we could not reproduce Burnet's results in chick embryos; further,

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whether these facts are related. The power of a parasite to produce disease—its virulence—is known to vary independently of its infectivity or power to spread from host to host. It seems, however, that the influenza A viruses prevalent in England in the spring of 1941 were poor things in all respects; their infectivity for man was low, virulence for man not very high and virulence for laboratory animals also low.

SUMMARY

No evidence of the presence of influenza A virus was obtained in material from the respiratory infections prevalent in England in the early months of 1940.

In January and February, 1941 no widespread influenza epidemic occurred in England, but laboratory studies indicated that a considerable proportion of the sporadic clinical influenza prevalent in those months was due to influenza A virus. The viruses recovered infected ferrets less easily than those of other years and were less readily adapted to infect mice. In contrast to Burnet's recently published findings (1940), we only succeeded in 2 instances out of 23 in infecting chick embryos by the amniotic route directly from material of human origin.

We wish to thank the medical men, both Service and civilian, who kindly provided us with material.

REFERENCES

Burnet, F. M. (1940a) *Brit. J. exp. Path.* **21**, 147.
— (1940b) *Aust. J. exp. Biol. Med.* **18**, 353.
— and Lush, D. (1936) *J. Path. Bact.* **43**, 105.
Francis, T. jun. (1940) *Science*, **92**, 405.
Horsfall, F. L. jun., Lennette, E. H., Rickard, E. R., Andrewes, C. H., Smith, W. and Stuart-Harris, C. H. (1940) *Lancet*, **2**, 413.
Smith and Andrewes (1938) *Brit. J. exp. Path.* **19**, 293.
Stuart-Harris (1941) *J. R. Army med. Cps.* in the press.
— Andrewes and Smith (1938) *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 228.
— Smith and Andrewes (1940) *Lancet*, **1**, 205.

EXTRA-ORAL SPLINTING OF THE EDENTULOUS MANDIBLE*

LEANDER POHL, M.D. VIENNA, L.D.S.

IN treating fractures of the edentulous lower jaw or cases where resection of the edentulous mandible has to be performed, difficulties may arise so that fixation cannot be achieved by the methods commonly used, such as intra-oral splinting, splints in combination with flanges, saddles, hooks, screws, clamps, nails, circumferential wiring, bandages and so on. Rhodes (1934), referring to fractures of the molar region when no teeth are present posterior to the fracture, writes: "It is difficult to see how any dental appliance can overcome such a difficulty as this, even if treatment can be taken in hand at once." Kelsey Fry (1939), in a lecture on first-aid treatment of fractures of the jaws, says: "I shall be surprised, however, if, by the end of the war, a satisfactory method has been found of replacing a displaced edentulous posterior fragment. . . ." Gillies (1935) doubts whether any surgical or dental control of the moderate displacement that occurs is either justifiable or possible in cases where the posterior fragment is short and edentulous. Warwick James (1940) goes so far as to accept malposition in certain cases of extreme difficulty.

One of the methods commonly used in the last war was to control the posterior fragment by vulcanite plates with flanges or saddles fitted to them. Round (1939) describes a method similar in principle. He fits a small bite block on a local cap of hard vulcanite fitting one or two upper teeth and carrying a cushion of soft vulcanite (Ash's soft rubber) to engage the lower fragment. When the bite block is in position he wires the upper and lower teeth together, thus assisting the posterior fragment to take up its normal position.

Nakamura (1937) has designed a device for splinting the edentulous posterior fragment by means of a metal screw vulcanised to a plate. The screw fits into a channel drilled in the edentulous fragment, or is fixed by a wire ligature through a hole drilled in it. He quotes a number of cases in which it was possible to leave the plate and screw in position from the date of resection until the final healing of the bone graft without complications.

* It was intended to read a paper on this subject at the Congress of Structive (Plastic) Surgery in London in 1937.

Bruhn and Lindemann (quoted by Wassmund (1927)) have treated a series of fractures by using the Codivilla-Steimann nail-traction. The posterior fragment is drilled with a burr, and two silver or aluminium wires connected by a plate are passed through. Schroeder's method (also quoted by Wassmund) is somewhat similar; he uses a metal plate which is fixed by means of a screw passing through a slit in it. Foramitti (1917) fixes the edentulous fragment with a nickel splint screwed direct to the bone.

Wassmund (1927) described cases which he treated by traction by means of an U-shaped wire passed through the bone and soft tissues. Collins (1937) reports on a similar method, advocated by Ivy and Curtis (1931). After an incision at the angle of the jaw, a wire is passed through the bone, and its end is brought out through the skin and twisted into a loop. The wire loop is attached to the wire in the head-piece, which is incorporated in a plaster bandage around the head. The two fragments are brought in perfect alignment after sufficient traction has been applied, and a firm union is achieved.

Darcissac (1933) and Lenormant and Darcissac (1927) point out that fracture of the edentulous mandible is perhaps the only condition in which interosseous wiring is justifiable. Their method is as follows (Darcissac 1933). An incision is made along the lower border of the jaw about 2 cm. long. The bone is drilled on each side of the site of the fracture with a burr 2–3 mm. from the lower border. A thick silver or bronze wire is passed through the hole and the ends twisted to form a loop by which traction can be made on the fragment. The external wound is then closed. The same procedure is done on the side opposite to the fracture so as to exert counter-extension on the larger fragment. Traction is made by elastic to the two handles of wire passing round the neck. Gillies (1935) advocates this method when the edentulous fragment is long and displaced and its control is of great importance. He recommends for such cases either drilling a hole in the angle of the jaw and passing a wire retractor band through it, vulcanite appliances, or gutter splints, which can be fixed by circumferential wiring in order to obtain good alignment of the fragment without causing necrosis of the medullary portion of the bone. Circumferential wiring is according to him particularly applicable to the depressed central fragment in an edentulous or partially edentulous case.

Berry (1941) describes a method of fixation for fractures of the edentulous mandible in which vitallium screws are inserted vertically into the bone fragments through the oral mucous membrane. The heads of the screws are then joined by a bar bent into appropriate shape. The apparatus may be applied outside the mouth if desired.

Rogers, Hall and Shackelford (1932) employ in certain cases open reduction intra-orally. An incision is made, the two ends of the jaw are exposed and two holes are drilled in the bone, through which silver wire is passed and twisted together.

The results of the various methods so far mentioned are not invariably satisfactory. The value of flanges or saddles in combination with vulcanite plates of fixed metal splints is according to my own and others' experience (Wassmund 1927, Steadmann 1939, Fell 1940) questionable, for they invariably carry the danger of necrosis owing to abrasion and ulceration of the tissues overlying the posterior fragment, and offer but small hope of success. My experience has been the same with wiring the fragment to a vulcanite plate. Methods of drilling holes in the bone and passing nails, screws or even wires through it as well, especially where a deliberate communication is made between the medullary portion of the bone and the oral cavity, are open to the grave risk of causing necrosis. Samuels (1934) reports a rare case of a fracture of an edentulous mandible where the patient died from embolism after holes had been drilled in the bone and wires passed through them. Conditions are sometimes most unfavourable for bone-grafting. Some of these methods are applicable only if enough teeth are standing in the larger fragment to provide anchorage for a plate. Surgical intervention may sometimes not be possible owing to lack of accommodation, time or skilled personnel if a great number of cases have to be dealt with, for instance at a first-aid post behind the front line.

The external splint suggested by Vaughan Tomey (1940) cannot be considered as a treatment splint but is a useful means of giving external support to a bandage and should prove useful in emergencies.

According to my experience with the elevation of a depressed malar bone, Bruhn's hook-extension, a

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modification of nail-traction, seems to be far superior to other methods, for the hook being inserted only superficially into the bone, there are fewer cases of necrosis. The method which I am going to describe is based on the same principle, using hook-extension (hook-traction) but avoiding most of the disadvantages of other methods. Its principle is the extra-oral application of hook-screws into each fragment of the fractured mandible, and connecting them by a bar welded to them.

DETAILS OF METHOD

The hook-screw (fig. 1) is made of stainless steel in three sizes. It consists of three main parts: (1) a hook ending in a sharp point, the shaft of which is square in cross-section; (2) a simple screw tapered at one end and with a square head at the other; and (3) a connecting rod between the two. The connecting rod is threaded at one end for the screw, and has a square hole at the other for the hook, as well as a locking screw.

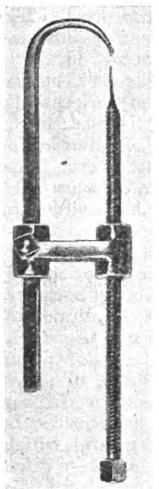

FIG. 1—The hook-screw.

Insertion of the hook-screw.—The site of insertion of the hook-screws depends on the type of fracture, the extent of external injuries present, and so on. It is applied best at the thickest part of the bone and as far from the line of fracture as is considered necessary. Before application the hook-screw is taken to pieces, and after the skin is surgically cleansed the hook is inserted so that injuries to vulnerable organs are avoided as far as possible. As soon as one can feel bone either slight pressure or traction is exerted. While the fragment is thus held in position with one hand by means of the hook the connecting rod together with the screw is slipped over the hook and then screwed tight. The screw is then screwed down, and advanced into the compact bone only, in order to avoid any injury to the bone-marrow. Three or four hook-screws should provide sufficient stability, but more may be used if necessary. There is no difficulty in inserting the hook-screws in the body of the mandible or the horizontal ramus, whereas care has to be taken if the ascending ramus is very short in order to avoid damage to the facial nerve or the parotid gland (see case-record).

The bar.—With the screws in position on both sides of the fracture a stainless steel bar 4 mm. thick is bent to shape according to the position of the hook-screws and the extent of external injuries present. The distance of the bar from the skin should be not less than an inch.

The welding process.—The hook-screws are then joined by means of the bar, which is welded to them in situ with the Rakos welder† (fig. 2) after alignment of the fragments. No special preparations are necessary except covering the skin with wet gauze for the heat during the welding process is only local. A cold-water spray is sufficient to cool the metal, so that no ill effects to the adjacent tissues need be feared if ordinary care is taken.

Welding has many advantages over soldering the bar on the screws previous to the insertion of the whole splint. First, one never knows the exact position of the hook-screw before it is inserted. Secondly, it may prove necessary to change one or the other hook before the fracture has united. By the use of welding this can be done without removing the whole splint, thus avoiding undue damage to the bone. Furthermore, any additional appliance can be welded to the bar—e.g., in cases where absolute fixation may become necessary. An additional bar is then welded to the main bar on one side, and fixed on the other to a head harness. Other auxiliary appliances, such as extra-oral joints, can be fitted in the same way without removing the splint.

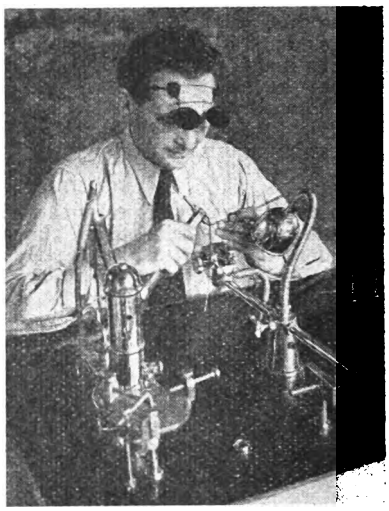

FIG. 2—Rakos welder in use.

Nevertheless, although welding is in our experience preferable, the bar can be joined to the hook-screws by means of special screws, or even soldered.

CASE-RECORD

Exact anatomical studies had been made regarding the site and mode of insertion of the splint as well as experiments with materials and the welding process before the technique was applied to the following case.

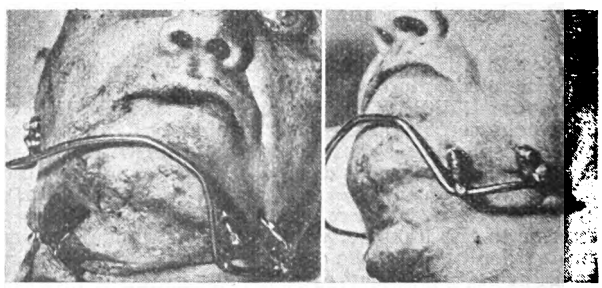

FIG. 3—Hook-screw splint in position, immediately after operation.

A man, aged 57, complained of pain and swelling in the right horizontal ramus of his mandible. His mouth was practically edentulous, for the lower canines, the only teeth present, were both very loose. A swelling could be seen extending from the right lower canine to the angle of the mandible, covered by normal mucosa. It was painless to palpation and showed the typical signs of a cyst. The radiogram seemed to confirm the diagnosis, but one very small hard indolent gland in the right submaxillary region caused suspicion of malignancy. After the cyst had been dissected out in the usual way microscopical examination of the cyst wall confirmed the suspicion of carcinoma.

Previous to the radical operation both canines were removed and dentures fitted. After a block dissection‡ of the affected glands and the soft submaxillary tissues involved, the diseased portion of the mandible was freed from its mucosa and

† The Rakos process is a fusion welding. It is executed with a high-resistance welding torch, which is brought into direct contact with the pieces to be welded, thus preventing the development of a stationary arc. The temperature employed is about 3000° C. This heat is developed within a fraction of a second, and the welding completed before the heat can be conducted from the welding spot. Thus, in spite of the intense concentration of heat, there are no ill effects to tissues or materials in the immediate vicinity of the spot welded, even within the patient's mouth. The electric power used is of very low voltage, thus avoiding any danger of electric shock. The apparatus is now manufactured in England by Technotherm, Ltd., of 113, Victoria Street, St. Albans.

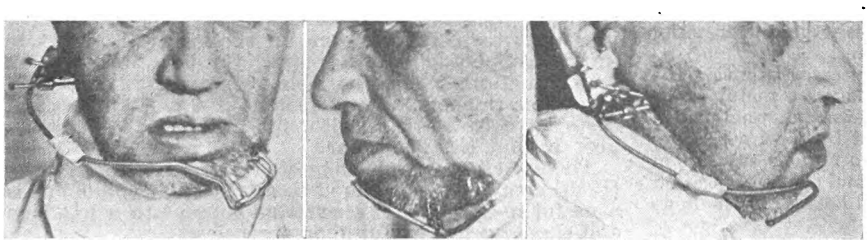

FIG. 5—Three weeks after operation.

‡ The operation (resection of the mandible and bone grafting) was performed in collaboration with Dr. O. Hofer at the Policlinic in Vienna in June, 1937.

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FIG. 4—Radiograms showing hook-screw splint in position. Above, anteroposterior view; below, lateral view of posterior fragment.

periosteum. The splint was then applied as described above before the bone was severed. Two of the hook-screws were inserted in the ascending ramus and two others before and behind the left mental foramen. Fig. 3 shows the patient immediately after the resection of his mandible with the hook-screw splint in situ. In fig. 4 the positions of the hook-screws are seen in radiograms. The posterior fragment was kept in position, and the patient was able to move his temporomandibular joints and chew gently shortly after the operation. The skin around the hook-screws was painted with Mastisol and covered with silver foil immediately after their insertion to reduce the danger of external infection. No signs of necrosis could be observed during the whole course of treatment, the only complication being a salivary fistula which developed at the site of one hook-screw on the ascending ramus. This unpleasant incident was, of course, anticipated, and is unavoidable with other methods as well if the posterior fragment is short. Fig. 5 shows the patient three weeks after the operation. The salivary fistula healed without any surgical intervention when the splint was removed after six weeks, leaving only slight scars at the site of the hook-screw. The posterior fragment remained in correct position until bone-grafting was performed.

DISCUSSION

The method described has been applied in this single case only, for circumstances did not allow me to make further investigations on this subject. But it proved so successful that I should like to see it more extensively used. It seems to offer an alternative way of treating cases where other methods are not satisfactory. It permits immediate reduction and fixation of the fragments without losing valuable time in the preparation of splints. The mouth, as well as all the parts of the face, are left free for any surgical treatment which may be necessary in a case of major injuries. Any alteration in construction required during the course of treatment is easily made without changing the splint or interrupting fixation. Proper feeding is facilitated from the first day after the splint has been inserted, and the patient is even enabled to masticate to a certain degree—both important advantages of this method. The mouth can be kept clean, and the muscles show much less atrophy because partial function is maintained. The simplicity of the technique allows its use by those without any special knowledge of dentistry. Its use should be limited to suitable cases. No doubt the posterior fragment is best left alone when displacement is only moderate and the fragment very short. But the method might prove useful in cases with much displacement as well as those with great loss of substance, especially of the body of the mandible, in order to avoid unsightly disfigurement and allows unrestricted movement of the temporomandibular joint.

SUMMARY

A method is described for the fixation of fractures of the edentulous mandible by means of steel hook-screws attached to each fragment and connected together by a bar welded to them in situ.

The technique is especially suitable for fractures in the region of the angle, or where there is great loss of substance in the body of the mandible. It permits immediate reduction and fixation without loss of time in preparing splints. The mouth and face are left free for necessary surgical treatment. Feeding is facilitated and the patient can chew to a certain extent as soon as the apparatus has been applied. The mouth can be kept clean and the muscles of the jaw can be exercised sufficiently to prevent atrophy.

REFERENCES

Berry, C. H. (1941) *J. Amer. dent. Ass.* **28**, 388.
Collins, W. J. (1937) *Brit. dent. J.* **62**, 79.
Darcissac, M. (1933) *Bull. Soc. Chirurgiens Paris*, **25**, 296.
Fell, S. R. (1940) *Brit. dent. J.* **68**, 457.
Foramitti, C. (1917) *Œst. Z. Stomatol.* No. 7.
Fry, W. Kelsey (1939) *Brit. dent. J.* **57**, 497.
Gillies, H. (1935) *Ibid*, **59**, 361.
Ivy, R. H. and Curtis, L. (1931) Fractures of the Jaws, Philadelphia.
James, W. Warwick (1940) *Brit. dent. J.* **68**, 52.
Lenormant, C. and Darcissac, M. (1927) *Bull. Soc. nat. Chir.* **53**, 503.
Nakamura, H. (1937) *Œst. Z. Stomatol.* No. 4.
Rhodes, A. (1934) *Brit. dent. J.* **57**, 16.
Rogers, L., Hall, C. T. and Shackelford, J. H. (1932) *Radiology* **18**, 28.
Round, H. (1939) *Brit. dent. J.* **67**, 295.
Samuels, I. (1934) *Ibid*, **56**, 487.
Steadmann, F. St. J. (1939) *Ibid*, **67**, 276.
Tomey, E. Vaughan (1940) *Ibid*, **69**, 55.
Wassmund, M. (1927) Fracturen und Luxationen des Gesichtsschädels, Berlin.

EXTERNAL PIN FIXATION FOR FRACTURES OF THE MANDIBLE

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FRACTURES of the mandible in the tooth-bearing area present a problem which can be efficiently solved by purely dental methods. The Curtis loop, the arch wire or the dental cap splint offer a good chance of an excellent result. When the patient has no teeth, or when the fracture occurs behind the tooth-bearing area, the problem is not so simple. In the region of the horizontal ramus Gunning splintage with circumferential mandibular wires is likely to succeed, but in fractures through or posterior to the angle the accepted methods of fixation have not proved universally satisfactory. These methods have included ingenious intraoral splints with extension apparatus intended to bear on and control the ascending ramus. Such methods depend for their success on the capacity of the mucous membrane to withstand pressure, and this capacity is limited to that part of the jaw which normally carries teeth. The alternative has been to fix the anterior fragment in correct relation to the upper jaw, and to apply traction to the angle of the mandible by means of a wire loop passed through the bone and then fixed either to a post-auricular support or by means of a bar to the cap splints on the anterior fragment. A wire at the angle, however attached, controls flexion at the temporo-mandibular joint but cannot and does not control the other two deformities —rotation and adduction.

We therefore considered that the method of crossed Kirschner wires, as introduced by Roger Anderson for

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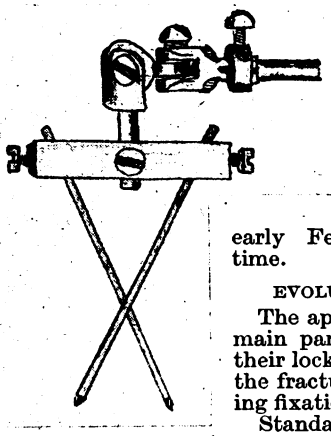

FIG. 1—Earliest type of plate and bar.

long bones, might enable us to apply direct skeletal fixation to the mandible. It may be of interest to follow the evolution of the method of applying these pins and of the type of intervening fixation from our first case in early February to the present time.

EVOLUTION OF APPARATUS

The apparatus consists of three main parts: a pair of pins and their locking plate on each side of the fracture line, and an intervening fixation bar.

Standard Kirschner wire is used, and it has been found that sizes smaller than 1·5 mm. in diameter are insufficiently stable, particularly under torsion. The wires, therefore, consist of 2 or 2½ in. lengths of 1·5 mm. Kirschner steel sharpened to a short bevelled pyramidal point. A pair of wires, crossing each other at an angle of about 60° before entering the bone, are introduced on each side of the fracture line and about ½ in. away from it. They are inserted close to the lower margin of the bone to avoid the inferior dental canal and they penetrate as far as the inner plate. It is now necessary to lock the outstanding ends of each pair together. The earliest type of plate used for this purpose is shown in fig. 1. It was found to be awkward in use, and a split type was then introduced. The screw employed to clamp the two halves of each plate together was at first also used to fix the connecting bar which ultimately unites the plates. This meant that each time an adjustment was made the plates had to be loosened on the pins and control of the bone fragments from outside was lost. In the next type (fig. 2*a*) the two halves of each plate were clamped together by two separate screws and a third screw was used to attach them to the connecting bar. This was too cumbersome, and fig. 2*b* shows a later type in which only a single thickness of metal is required.

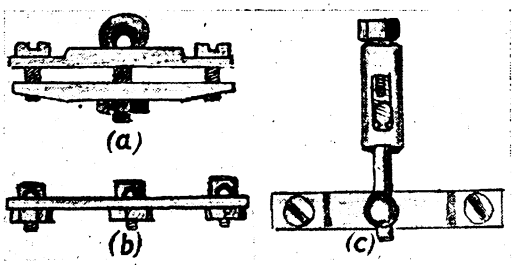

FIG. 2—*a* and *b*, stages in development of plate; *c*, universal joint at end of bar.

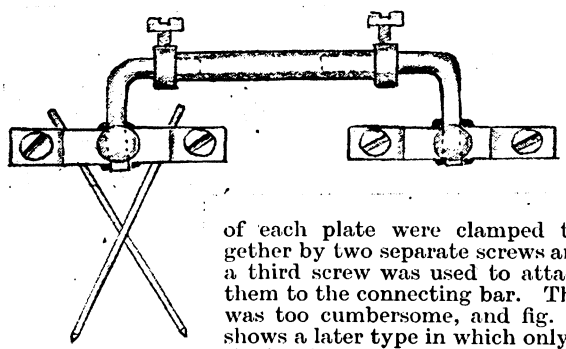

FIG. 3—Last stage but one in development of apparatus.

The next problem was to devise an intervening bar. This must be capable of lying slack and allowing movement in any direction so that the fracture can be easily reduced. When reduction is effected the bar must be capable of being locked rigidly in its final position. The first type of bar contained, in effect, two universal joints, one of which is shown in fig. 1. It worked well, but it was felt that if these joints were to be of reasonable size the chances of positive fixation were small. We therefore tried to use a single piece of ⅛ in. German silver wire, which was to be bent to the required shape on the operating table, but it was found that minor corrections were difficult to make, even with specially devised keys. The third type incorporated a universal joint at each end of the rigid bar (fig. 2*c*); but no miniature universal joint is really satisfactory. The next type of fixation (fig. 3) consisted of two ⅛ in. rods, bent at right angles and fitted into a short length of tubing. These rods were attached to the plates in such a way that universal movement was possible. At the same time positive locking was obtained by only four screws, one on each plate and two on the central tube. The whole apparatus is extremely simple and can be constructed by any mechanic, even without specialised tools. An even simpler type is now used, in which one of the screws on the tube has been eliminated. On one or two occasions pins have become slack between the second and third week, and the weight of the apparatus may have been partially responsible for this. We have therefore constructed the appliance in aluminium alloy and it now weighs considerably less than half an ounce. Its construction and use are shown in fig. 4.

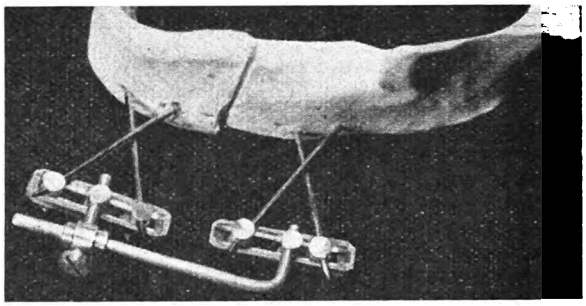

FIG. 4—Latest type of apparatus applied to skeleton jaw.

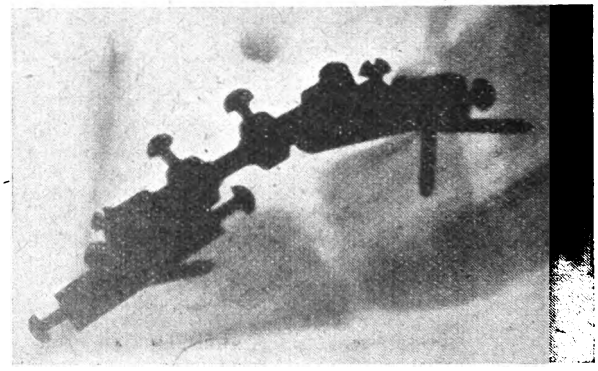

FIG. 5—Radiogram of early type of splint in use.

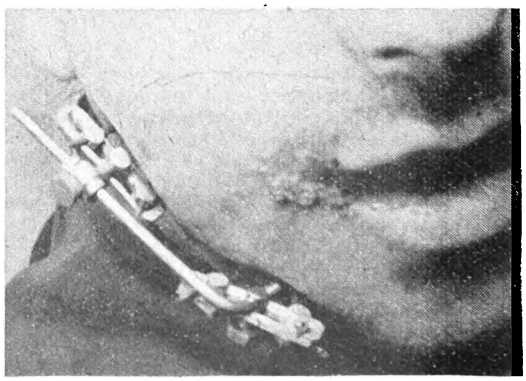

FIG. 6—Patient opening his mouth 18 hours after fixation of fracture.

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It may be argued that the introduction of 1·5 mm. Kirschner wire through the skin of the face is an unwarranted barbarism. Against this must be offset three facts. First, hardly any discomfort is experienced by the patient. Secondly, fixation is so positive as to enable the surgeon to avoid locking the mandible to the upper jaw in many cases; the resultant maintenance of movement of the temporomandibular joint ensures that blood-supply remains at its optimum, the patient is enabled to eat in comfort and oral cleanliness is readily obtained. Thirdly, such scars as do occur seldom need treatment, but at the worst it is simple to carry out the necessary minor excision under a local anæsthetic.

The apparatus has now been used in 19 cases. We feel that the principle is worthy of further elaboration though it is probable that it will be applicable only to chosen cases and that it should not be used to replace the simpler and more standard methods for the great majority of fractures.

SUMMARY

By the use of an orthopædic principle it has been possible to elaborate an apparatus to control fractures of the mandible occurring behind the tooth-bearing area.

A pair of crossed Kirschner wires are inserted into each fragment. Various methods of locking each pair into a unit and then joining the units to maintain reduction are described.

The advantage is absolute fixation by extra-oral means. Oral cleanliness is readily obtained and function at the temporo-mandibular joint is maintained. Postoperative discomfort is negligible and feeding is simplified. The disadvantage is the occasional necessity to treat the small residual scars.

The method is in the early stages of its elaboration and its use should be limited to those fractures which cannot be adequately controlled by standard methods.

BLOOD CHANGES FOLLOWING CONTROLLED HÆMORRHAGE IN MAN

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RECENT experience of the treatment of air-raid casualties in the resuscitation wards has shown that most of the cases requiring intravenous infusions are suffering mainly from the effects of hæmorrhage. On admission of a patient to hospital it is often difficult to assess the amount of bleeding which has taken place. It is not until a day or two later, when the degree of maximum dilution can be measured and when blood corpuscles have not been transfused in treatment, that the extent of the hæmorrhage can be estimated. The clinical picture of such a patient may be complicated by wound infection or other conditions which reduce hæmoglobin percentage, but in the majority of cases reduction of hæmoglobin indicates hæmodilution following hæmorrhage. A simple method of measuring circulating blood-volume would be of great value, although there is still the objection that the original blood-volume is unknown. Such a method is not at present available.

The hæmoglobin percentage in a case of recent traumatic hæmorrhage gives no indication of the extent of the hæmorrhage, since dilution may not have occurred. The object of this work has been to investigate the course of dilution following controlled hæmorrhage. Hæmoglobin percentages, plasma proteins, blood-pressure and pulse changes have been followed, as well as blood-volume, plasma-chloride and blood-urea in a few cases.

METHODS

Volunteers were venesected and 28 observations were made. The subjects were convalescent hospital patients, and each one had a thorough clinical examination. All were found to have normal circulatory systems apart from three cases (Nos. 6, 7 and 9) who had hypertension. The clinical diagnoses of those with normal circulatory systems were neuroses (nine cases), chronic nervous diseases (eight cases), chronic bronchitis (two cases), convalescent lobar pneumonia (two cases), uncomplicated gastric ulcer, orthostatic albuminuria, undescended testicles and headache (each one case). Two subjects (Nos. 2 and 7) were found to have low initial hæmoglobin; both had been previously bled and regeneration of hæmoglobin was not complete. Nos. 7 and 9, and 13 and 24 are the same subjects venesected on different occasions.

Venesection was performed in the usual manner through a wide-bore needle, the subject resting on a couch with the trunk at an angle of 30°. Care was taken to keep the subject warm and at a constant temperature. An initial resting period was allowed for blood-pressure, pulse and hæmoglobin estimations to reach an equilibrium.

Hæmoglobin was estimated by taking 0·02 ml. blood samples from a freely flowing ear puncture and estimating the percentage by a photoelectric method (Hill and Pincock, to be published) accurate to 0·4% (standard error).

Plasma-proteins, plasma-chlorides and blood-urea were estimated by the methods of King, Haslewood and Delory (1937).

Blood-volumes were estimated in three subjects by a modified carbon-monoxide method. This was in principle similar to that described by Hartmann (1937), except for the use of red and infrared light instead of green and yellow light for measuring carboxyhæmoglobin.

RESULTS

The main data are shown in the table.

Blood-pressure.—Sixteen subjects showed a fall in blood-pressure, but in eight of these the pressure had returned to its previous level within an hour; three cases (Nos. 12, 26 and 28) showing this temporary reduction in blood-pressure developed a simultaneous bradycardia of 60 beats per minute or less; in eight subjects the fall in blood-pressure was prolonged up to as much as 24 hours, a group which included two hypertensive subjects.

The fall in pressure usually occurred with dramatic suddenness at the end of venesection, which was stopped at the first sign of a fall. Other symptoms appeared at the same time. The face became pale, the skin cold and clammy, and the respiratory rate frequently increased. Yawning was also a prominent feature. The patient complained of faintness, dizziness and nausea. There was frequently a desire to defæcate and urinate, and one subject actually passed urine. Unconsciousness often supervened, with depression of respiration, cyanosis, twitching of the limbs, rotation of the eyes, disappearance of the heart sounds and absence of pulsation in the large arteries. Bradycardia occurred with the first fall in blood-pressure and persisted. Loss of consciousness was usually brief, but case 6 was unconscious for five minutes. Case 28 had a fall of blood-pressure, bradycardia and syncope after the removal of 500 c.cm. blood; he was then allowed to recover, and half an hour later a further 600 c.cm. was withdrawn without a significant change in blood-pressure or a recurrence of other symptoms.

In nine subjects the effect of posture on systolic blood-pressure and pulse was investigated after venesection. All showed a striking and immediate fall in systolic blood-pressure on sitting sharply upright on the couch. The extent of this fall was in every case greater than 40 mm. Hg and always occurred within 10 seconds of sitting upright. If the sitting position was maintained, in most cases the systolic blood-pressure rose within 30 seconds to its previous resting level or to a figure slightly lower than that resting level, but in a few cases syncope terminated the observation. Fig. 1 illustrates this exaggerated response of systolic blood-pressure to alteration in posture compared with the normal response in the same individual after he had restored his original blood-volume. The heart-rate, which was followed by continuous electrocardiographic tracings, showed a tachycardia with an increase of more than 30 beats

* Working for the Medical Research Council.

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RESULTS OF CONTROLLED HÆMORRHAGE IN MAN

Subject	Age	Sex	Blood withdrawn (c.cm.)	Time of vs. (min.)	Blood-pressure (mm. Hg)			Pulse-rate (per min.)		Hæmoglobin (%)				Time of max. dilution (hr.)	Expected dilution	Plasma-proteins (g. per 100 c.cm.)				Blood-volume (litres)		Plasma-chlorides (mg. per 100 c.cm.)				Blood-urea (mg. per 100 c.cm.)		
					Initial	At end of vs.	Duration of fall	Initial	At end of vs.	Initial	Immediately after vs.	1 hr. after vs.	At max. dilution			Initial	Immediately after vs.	1 hr. after vs.	At time of max. dilution	Initial	At max. dilution	Initial	Immediately after vs.	1 hr. after vs.	At max. dilution	Initial	1 hr. after vs.	At max. dilution
1	40	M	1150	12	105/70	70/58PR +	20 hr.	82	60	73	68	68	53	19	56	8	8	..	8	..	..	..	..	..	..	36	36	..
2	44	M	1150	15	115/70	105/75PR +	..	76	100	50	49	49	40	24	38	6·4	..	..	7	..	..	..	..	..	..	40	..	43
3	50	M	1150	10	118/86	105/85PR +	..	54	94	107	101	101	86	23	82	7·6	7·6	..	7·2	..	..	..	..	..	..	28	..	32
4	49	F	1150	8	148/80	128/82PR +	20min.	80	92	72	70	70	57	72	55	7·1	..	..	6·8	..	..	..	..	..	..	28	..	17
5	68	F	1150	11	140/75	45/ ? PR +	8 hr.	72	56	96	88	87	74	23	75	8·2	..	7·9	7·8	..	..	..	..	..	..	36	36	38
6	53	M	1100	10	206/106	68/46PR +	24 hr.	64	42	95	90	89	66	24	77	..	..	..	..	..	..	..	..	..	..	49	52	55
7	42	M	1100	12	206/103	44/ ? PR +	24 hr.	80	94	63	60	61	52	24	50	6·8	..	6·4	..	..	..	456	..	455	..	72	72	113
8	40	M	1100	18	96/76	96/70	..	76	106	95	88	85	78	5	76	5·9	..	7	..	..	..	621	..	583	567	25	23	28
9	42	M	1100	12	194/120	172/118	6 hr.	92	116	70	68	66	56	26	56	7·4	7·2	..	6·8	..	..	417	420	..	421	46	88	65
10	16	M	1100	10	120/80	115/80PR +	..	76	84	92	90	89	74	48	71	..	..	..	..	..	..	..	..	..	..	38	38	38
11	45	M	1060	20	124/76	122/80	..	84	80	107	103	103	90	9·5	85	7·1	7	..	6·3	..	..	624	624	..	624	31	31	36
12	45	M	1050	18	120/90	40/ ?	20min.	58	40	109	106	105	87	48	86	6·9	..	..	6·9	..	..	..	..	..	..	40	..	40
13	19	M	1000	21	125/80	110/68	10min.	68	72	97	98	94	89	96	78	6·2	..	..	6·2	..	..	610	..	..	611	34	34	..
14	39	M	900	20	120/70	100/66PR +	1 hr.	70	86	77	74	77	68	24	63	6·2	6·4	..	6·5	..	..	597	601	..	630	34	34	40
15	40	M	800	11	122/86	100/86	24 hr.	78	118	100	100	99	88	21	84	..	6·1	..	6·2	..	..	640	642	..	660	22	22	27
16	48	M	800	10	110/80	110/85	..	84	86	89	86	86	71	19	74	7·8	7·8	..	7·8	..	..	..	..	..	..	38	38	38
17	69	M	800	15	130/80	135/85	..	88	90	95	94	94	87	92	80	..	..	..	..	..	..	..	..	..	..	..	..	..
18	60	M	800	15	114/74	98/70	1 hr.	72	76	95	95	95	84	22	80	6·6	..	6·5	6·5	..	..	..	..	..	..	..	..	..
19	42	M	750	24	86/65	85/65	..	60	64	105	100	95	83	4	85	6·7	6·6	..	6·9	4	4·2	..	..	..	..	..	..	..
20	53	M	720	6	114/64	104/68	..	68	72	95	..	94	80	23	83	..	..	..	..	..	..	..	..	..	..	..	..	..
21	45	M	720	15	108/62	95/50	..	68	74	84	77	75	62	19	73	7·8	7·2	..	6·8	5·3	6·6	..	..	..	..	..	..	..
22	54	M	720	22	116/84	90/72	1 hr.	80	96	120	..	111	92	48	103	6·5	..	..	6·6	4·5	5·2	..	..	..	..	..	..	..
23	33	F	700	12	138/74	130/65	..	..	..	77	77	74	61	90	62	7·3	7·1	7·1	6·9	..	..	..	..	..	..	..	..	..
24	19	M	700	13	102/62	80/58	20 hr.	68	69	90	88	87	77	24	77	7·1	..	..	7·1	..	..	560	..	..	560	30	30	32
25	44	M	650	18	108/78	102/76	..	72	76	74	73	71	69	3	64	6·5	..	6·5	..	..	..	..	..	..	..	34	34	35
26	30	M	550	10	114/90	78/68	20min.	60	48	89	83	87	83	..	80	8	8	..	..	..	..	621	647	..	..	32	32	..
27	40	M	465	10	128/90	92/72	24 hr.	80	82	95	92	95	87	4	85	7·1	7·1	..	6·7	..	..	607	594	..	594	..	..	..
28	47	M	500	5	120/72	60/50	20min.	72	44	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
			600	10	110/ ?	98/ ?	..	72	72	105	100	100	84	48	82	7·3	..	..	7·1	..	..	..	..	..	..	46	..	46

PR + = Exaggerated response of blood-pressure to postural changes. Vs. = venesection. Max. = maximum.

per minute, except in two cases where a bradycardia developed. On lying back there was in every case a rapid return of the blood-pressure and heart-rate to normal. The nine subjects who showed this response are indicated in the table by PR +. This exaggerated response to posture could be repeated at will, and some subjects still showed the response 5 or 6 hours after venesection.

Pulse-rate.—Six subjects (Nos. 1, 5, 6, 12, 26, 28) showed bradycardia, always associated with a fall of blood-pressure; another five (Nos. 2, 3, 8, 9, 15) showed tachycardia with a rise of heart-rate of more than 20 beats a minute; the remainder had little or no change in heart-rate.

Hæmoglobin percentage and blood-volume.—Initial dilution as judged by the hæmoglobin values was small. Eight subjects (Nos. 1, 3, 5, 6, 8, 19, 26, 28) showed a fall of Hb. of 5% or more and the rest less than 5%. The majority of the cases showed a maximum dilution which corresponded closely with the theoretical dilution calculated on the assumption that the blood-volume was five litres. Three subjects (Nos. 6, 21, 22), however, showed a maximum dilution which was considerably greater than the calculated figure, and in two of these subjects actual blood-volume estimations confirmed that there had been an overdilution and that the blood-volume had increased over the initial value. In cases 19, 21 and 22 the theoretical dilution is calculated from the observed blood-volume. Case 13 seemed to show failure to dilute to the theoretical figure, though followed for a considerable period. A week later the same subject (24) was again venesected, and on this occasion showed a normal dilution. The time taken to reach a maximum dilution showed great variation, from 3 to 90 hours; no reason has yet been observed why some subjects take a long and others a short time to reach maximum dilution.

Plasma-protein, plasma-chloride and blood-urea.—There was but little change in plasma-proteins while dilution was taking place. Cases 9 and 21 showed a fall, case 21 being one of those with over-dilution, while case 8, who had a rapid dilution, showed a rise in plasma-proteins. There was no significant change in plasma-chlorides after venesection. Blood-urea changes were also negligible except in cases 6, 7 and 9, who had hypertension with some renal involvement. The duration of the azotæmia in case 9 is illustrated in fig. 2.

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DISCUSSION

The mechanism of dilution and regeneration of plasma-proteins and hæmoglobin after experimental hæmorrhage in animals has been reviewed by Whipple (1938). In man, Stead (1940) removed 760–1220 c.cm. of blood from six subjects. Five showed a sudden fall of blood-pressure and bradycardia. There was an immediate small dilution with protein-poor fluid, and dilution continued up to 72 hours without further changes in plasma-proteins. Our results show that the rate of dilution varies greatly in different subjects, and that therefore the hæmoglobin percentage estimated at an arbitrary time after hæmorrhage from an injury may give no indication of the extent of the hæmorrhage. The rate of dilution may also vary in the same subject, as illustrated by cases 13 and 24, the same subject being venesected on two separate occasions at an interval of 5 weeks. There was no obvious change in conditions between the two observations, and regeneration of blood had taken place.

The dilution of hæmoglobin is not paralleled by a dilution in plasma-proteins. In only one subject, case 21, was the small initial dilution associated with the passage of a protein-poor fluid from the tissues into the blood. Further fall of hæmoglobin continued without dilution of plasma-proteins, suggesting that there are available proteins in the tissues which pass into the blood-stream and maintain its colloidal content. The mechanism of this mobilisation of proteins is unknown, although there is evidence that the liver is an important source (Whipple 1938) and the cells of the reticulo-endothelial system may play a part (Cutting and Cutter 1935). Over-dilution may occur occasionally, a phenomenon that might be of clinical importance when considering the transfusion of patients with low hæmoglobin levels after hæmorrhage, and indicating the advantage of actual blood-volume estimations in such states.

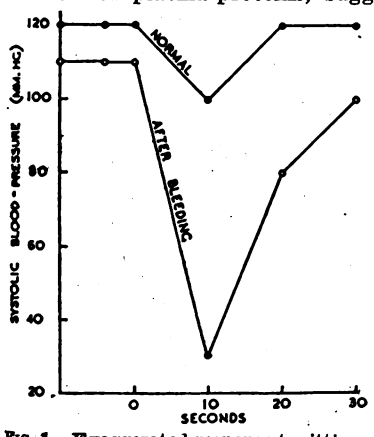

FIG. 1—Exaggerated response to sitting up after bleeding.

The fall of blood-pressure in certain subjects has a practical application to "shocked" casualties and the bleeding of donors. Emotional causes seem unlikely in our subjects, since the fall occurred only at the end of a large venesection, and a sudden drop of blood-volume appears to be the initiating mechanism. The prolonged fall in a few cases is in accord with well-known clinical observations after hæmorrhage. The exaggerated postural response may be part of the same mechanism, for it is known to happen in other conditions in which there is reduced venous return, such as long standing in the erect posture (Turner 1927) and untreated Addison's disease (Berry, Horton and MacLean 1940). Although an exaggerated postural response can occur in conditions in which there is no reduction of blood-volume, yet its presence in casualties suffering from hæmorrhage may be one further indication that a diminished blood-volume is present. Thus the postural response may be of value clinically to demonstrate reduction of blood-volume after suspected hæmorrhage. The pulse-rate seems to be of little value after hæmorrhage, since it may be slow, fast or show no change, an observation that agrees with the findings in air-raid casualties that have bled extensively (unpublished data).

The insignificant alteration in plasma-chloride confirms the observations made by Black (1940) after experimental hæmorrhage in dogs. The same worker observed a slight rise in blood-urea, but this is not confirmed except in those cases in which there is pre-existing renal damage.

Mr. D. K. Hill was responsible for the blood-volume estimations, and coöperated in the study of some of the cases in this series. Biochemical estimations were made in the school laboratories (director, Dr. E. J. King).

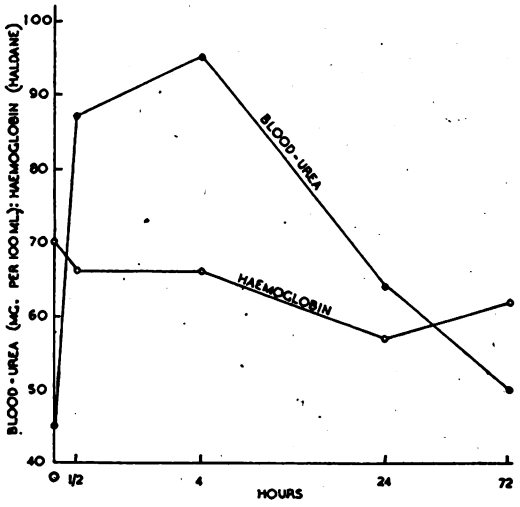

FIG. 2—Azotæmia following bleeding in subject 9 with malignant hypertension. Venesection of 1100 c.cm. was carried out at zero time.

SUMMARY

Twenty-seven convalescent patients with normal circulatory systems were bled up to 1150 c.cm. and blood-pressure, pulse-rate, hæmoglobin percentage, plasma-protein, plasma-chloride, blood-urea, and, in a few subjects, blood-volume were followed.

Sixteen showed a fall of blood-pressure with syncope; six of these had bradycardia. In half, the fall of blood-pressure was temporary; in the rest it was prolonged up to 24 hours. The response to posture (fall of blood-pressure on sitting up) was exaggerated in all of nine subjects investigated.

The heart-rate may be slowed, increased or unchanged after hæmorrhage.

The time taken to reach maximum hæmoglobin dilution varied greatly, from 3 to 90 hours average (32 hours). Three subjects showed overdilution.

Plasma-protein concentration showed little or no change while dilution was taking place. Plasma-chloride showed no change, nor did the blood-urea except in cases with known renal impairment.

REFERENCES

Berry, M. R., Horton, B. T. and MacLean, A. R. (1940) *Med. Clin. Nth Amer.* **24**, 1095.
Black, D. A. K. (1940) *Lancet*, **2**, 618.
Cutting, W. C. and Cutter, R. D. (1935) *Amer. J. Physiol.* **114**, 204.
Hartmann, H. (1937) *Ergebn. Physiol.* **39**, 413.
King, E. J., Haslewood, G. A. D. and Delory, G. E. (1937) *Lancet*, **1**, 886.
Stead, E. A. (1940) *J. clin. Invest.* **19**, 776.
Turner, A. H. (1927) *Amer. J. Physiol.* **81**, 197.
Whipple, G. H. (1938). *Amer. J. med. Sci.* **196**, 609.

PHARMACY IN EXILE.—The college of the Pharmaceutical Society continues to sojourn happily in Cardiff, while the pharmacological laboratories and the department of nutrition have found a billet with the National Institute for Research in Dairying at Reading. As Mr. H. Berry, dean of the college, in the annual report for 1940, points out, reduction in teaching staff has decreased the amount of research work, but even so the report contains much that is of interest to the medical researcher in war-time. The influence of cooking on the vitamin-content of food, the components of acriflavine and the chemistry of the vitamin-B complex are some of the subjects which have engaged the attention of the college staff. The department of pharmacology records a rapid and convenient method for the assay of heparin, and observations on the property of a transparent artificial resin, perspex, to delay the clotting of blood, suggest that this substance may replace the paraffin-lined test-tubes and paraffin-lined glass cannulæ used in animal experiments.

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TRICHINIASIS IN SOUTH-EAST LONDON

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THE present outbreak was traced to one particular supply of sausages, and the incubation period in most cases was known exactly. We had exceptional opportunities for investigating a compact group at risk, whether persons showed symptoms or not. Our cases came from (*a*) the staff of a local fire station, (*b*) neighbours supplied with sausages about the same day and by the same butcher as the station, and (*c*) one patient from this area who bought sausages elsewhere in the district. Colonel Cecil Maddock of the Ministry of Health investigated the public-health aspects of the outbreak and found that all these sausages came from one pork supply. The two severest cases included here are being fully reported by Houston and Ross (1941).

SUMMARY OF OUTBREAK

	Fire-staff	Others
Number known at risk to trichiniasis ..	30	12
(*a*) Full picture of disease—i.e., puffy eyelids, face, or lips; well-marked eosinophilia; and most, or all, of the following: coryza, cough, headaches, gross sweating, malaise, aches and stiffness in neck and limbs, gastro-intestinal disturbances	6	7
(*b*) Features as in (*a*) but no eosinophilia.	1	1
(*c*) Features as in (*a*) but no puffiness and no well-marked eosinophilia	6	1
(*d*) Gastro-intestinal disturbances only ..	2	1
(*e*) Malaise, aches and cough only ..	1	0
(*f*) Entirely symptom-free	14	2
(*g*) Died	0	1

Firemen.—Two firemen were admitted to St. Alfege's Hospital and found to have trichiniasis. We then investigated the station staff. Each member was questioned, examined clinically if indicated, and a blood-count done in each case. Those away sick were traced and investigated. The evidence showed that the peccant sausages were eaten at breakfast on May 20, 1941. The staff is divided into teams A, B and C. Thirty members of A and B ate these sausages and noticed that many were underdone. The twelve members of team C were off-duty, did not eat that meal, and were entirely symptom-free. Only members of teams A and B developed trichiniasis. (We were not aware of this team system until all the personnel had been assessed clinically.)

The full picture of trichiniasis was seen in six firemen, and one other showed all features except eosinophilia. Of these seven, two were ambulant and miserable, two were ill at home, and three in hospital. (One of the last three was traced to the Park Hospital, where he had been sent for typhoid fever, but where trichiniasis had already been diagnosed. He was included by courtesy of Dr. H. S. Banks.) Six others showed many features of trichiniasis but no puffy eyes and no definite eosinophilia. In two of these the eosinophil total was 540 and 600 per c.mm. Other findings are given in the table.

Neighbours.—In family A. B. three brothers developed the full disease, one required hospital treatment, one took to bed at home, and one was ambulant. The eldest brother disliked sausages and could not be induced to eat them. But on May 21, 1941, his mother cooked toad-in-the-hole. He wanted the batter but only got some on condition that he ate sausage, which he did. The sausage was underdone. He had symptoms 7 days later. Mother and daughter unselfishly allowed the brothers to consume the whole dish and were symptom-free.

In family C. D a girl of 13 had the full disease. Also at risk were her father, who remained well, and her sister who had gastro-intestinal symptoms only at the same time as her sibling.

Mrs. E. F. developed trichiniasis and died. Trichinella larvæ were found in her blood and Professor Leiper demonstrated a larva in her diaphragm at necropsy performed by Dr. Arthur Davies. Also at risk were her son who showed all features except eosinophilia, her daughter who remained well, and a lodger who developed clinical trichiniasis, puffiness excepted (eosinophil total 500; subungual hæmorrhages present).

Mrs. G. H. had eaten raw sausages from childhood, but since the war began she always "half-cooked" them. She had the full disease. No other member of the family ate sausages.

Mrs. I. J. acquired trichiniasis. Prof. R. T. Leiper saw her at St. Alfege's Hospital and obtained from her the history that she ate the bits of sausage which extruded from the ends during preparation for cooking. Only fully cooked sausages were given to others of her family, none of whom developed symptoms. Discussions with local doctors suggested that there were but few more clinical cases.

DISCUSSION AND ANALYSIS

Dickman (1938) found that nearly 10% of all pork sausages obtained at random in stores in different parts of the city of Philadelphia contained trichinella larvæ. Gould (1940), in a series of 500 unselected consecutive autopsies in Detroit, found 93 cases of infestation with trichinellæ. Young (1941), in 47 autopsies from Wolverhampton and Birmingham areas, found trichinellæ in 6, although Van Someren (1937) in 200 London autopsies found them only in 2. The latter summarised the previous records of trichiniasis in Great Britain.

What features justify a clinical diagnosis of trichiniasis? Kaufman (1940), in his full review, noted the irregular manifestations of the disease, and Hall (1937) considered that there was no adequate clinical picture available. Both puffiness of the eyelids and face and eosinophilia can be absent and the diagnosis yet be certain (Spink and Augustine, 1935, Kaufman 1940). In the present outbreak some patients showed neither puffiness nor eosinophilia but otherwise had the same features at the same time as their fellows with classical trichiniasis. Cases with epigastric pain as the only symptom are known (Conner 1929) but in the sporadic cases reported eosinophilia was well-marked. In outbreaks like the present how should cases with gastro-intestinal disturbances only and no eosinophilia be regarded? Hall (1937) stated that atypical trichiniasis probably makes up the large bulk of cases.

Puffy eyelids.—Two patients sought treatment because they looked Chinese. Swelling of the eyelids was noted by Sheldon (1941) in every case seen, but by Spink and Augustine in only 17 of 35 cases, and by Kaufman in 19 of 27 cases. Our experience is shown in the table. Two patients with puffy eyelids also had œdema of the ankles.

Eosinophilia.—In this outbreak there was a very high correlation between eosinophilia and puffiness of the eyelids or face. The eosinophils ranged from 16 to 61% and from 1600 to 18,000 per c.mm. The eosinophils were persistently high several weeks after symptoms began; 6 out of 7 firemen who originally had eosinophilia were examined 10 weeks after the acute infection. An eosinophilia was still present, ranging from 10 to 47% or 800 to 7800 eosinophils per c.mm. One patient had only 2% eosinophils on the sixth day of symptoms, but two days later they had risen to 30% of 32,000 white cells per c.mm. Two patients had full clinical features and puffy eyelids without eosinophilia; a total of three counts was done on them; there was a substantial leucocytosis each time but the eosinophils did not exceed 1% or 150 per c.mm. With the exception of three patients, who had symptoms and eosinophil-counts of 540, 600 and 500 per c.mm., and who have been mentioned in the text, there was no tendency to a "mild" eosinophilia—either the eosinophilia was gross, as in 6 out of the 7 fireman with puffy eyelids, or absent, as in the 7th case with puffy eyelids and the 6 other firemen with the complete picture except for puffy eyelids. Blood-counts were also carried out on 15 out of 16 people "at risk" who never showed symptoms. Three of them had eosinophil-counts between 400 and 450 per c.mm., which may perhaps be regarded as slightly above the usual normal; the remainder had very low eosinophil-counts. Of the third team, who were not at risk, the highest eosinophil-count among 12 firemen was 325 per c.mm.

Course of disease.—The incubation period varied from 5 to 16 days, and in the majority was under 11 days. Symptoms usually lasted less than a fortnight, but several patients were ill for a month and then felt weak. Of the 8 fireman who were most seriously affected, 6 were

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off duty for 9 weeks or more, and 1 was discharged from the fire-service as unfit. An obese woman of 69 died, but a fireman of 19, apparently equally ill, recovered. Patients while in hospital were febrile for up to 10 days with a peak of about 102° F. During this period the pulse-rate averaged 90–95 per min.

Rashes, petechiæ, nails.—Urticaria occurred in 2, an erythema in 1, and papules in 1 other. Petechiæ of the forearms were noted in the 2 most ill patients, and on the inner cheek, palate, or floor of the mouth in 3 cases. The characteristic subungual "splinter" hæmorrhages (McNaught 1939) were present in 6 patients. In the fatal case they were also present under the toenails.

Gastro-intestinal and respiratory symptoms were prominent in our cases, but they nearly always appeared at the same time as the other features. Constipation was twice as common as diarrhœa. Coryza and cough were present in three-quarters of the cases, often ushering in the disease. Minot and Rackemann (1915) laid stress on the frequency of cough.

Mental and neurological symptoms.—Two patients had features suggesting encephalitis, and one of these died (see Houston and Ross). A third patient thought he "was going mad." A fourth had "never been so drowsy," and a fifth showed one extensor plantar response throughout his illness.

Skin tests.—Dr. P. B. Beeson and his colleagues did trichinella skin tests (see McCoy et al 1933) on those involved, and are continuing their studies.

Other features.—Hypotension was noted by Spink and Augustine (1935) and others. In our series, blood-pressure was normal. The blood-sedimentation rate has rarely been done, and when done has not been much raised (Kaufman 1940). We were unaware of this until our patients were improving, but on 3 inpatients tested on the 21st, 16th and 23rd day of symptoms, the rate was 21, 18 and 11 mm. per hour (100 mm. tube), the maximal normal value being 8 mm. per hour. Anæmia was absent even in very ill patients. Treatment (see Van Someren 1939) was symptomatic only.

SUMMARY

An outbreak of trichiniasis occurred among the members of a fire-station and a group of neighbours. All cases were traced to a single supply of sausages.

Of 42 persons at risk 26 developed the disease but only 13 showed the full clinical picture. There was 1 death.

We are grateful to Dr. B. A. Young, medical superintendent of St. Alfege's Hospital, L.C.C., Dr. F. L. Keith, medical officer of health for Deptford, Prof. R. T. Leiper, and District Officer A. L. Greenhead and Station Officer T. P. Murphy of the London Fire Brigade for their coöperation, and to Mr. D. H. Jones and Miss B. L. Thurland who carried out many of the blood-counts.

REFERENCES

Conner, L. A. (1929) *Ann. inter. Med.* **3**, 353
Dickman, A. (1938) *J. Lab. clin. Med.* **23**, 671.
Gould, S. E. (1940) *Amer. J. clin. Path.* **10**, 431.
Hall, M. C. (1937) *Pub. Hlth Rep. Wash.* **52**, 539.
Houston, J. C. and Ross, L. (1941) *Lancet*, **2**, 397.
Kaufman, R. E. (1940) *Ann. intern. Med.* **13**, 1431.
McCoy, O. R., Miller, J. J. Jun., and Friedlander, R. D. (1933) *J. Immunol.* **24**, 1.
McNaught, J. B. (1939) *Amer. J. trop. Med.* **19**, 181.
Minot, G. R. and Rackemann, F. M. (1915) *Amer. J. med. Sci.* **150**, 571.
Sheldon, J. H. (1941) *Lancet*, **1**, 203.
Spink, W. W. and Augustine, D. L. (1935) *J. Amer. med. Ass.* **104**, 1801.
Van Someren, V. D. (1937) *Brit. med. J.* **2**, 1162.
— (1939) *Ibid.* **1**, 376.
Young, M. (1941) Quoted in *Lancet*, **1**, 702.

TRICHINIASIS WITH CEREBRAL SYMPTOMS

REPORT ON TWO CASES

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IN the course of an outbreak of trichiniasis, described by Davis and Allott,[1] the two most severe cases came under our care. Each showed special features.

CASE 1

Fireman, aged 19, admitted to St. Alfege's Hospital on June 6, 1941. Illness started on May 30 with vague malaise and anorexia. On June 1 slight puffiness of the lips and cheeks was noticed and lasted for about 48 hours. Then complained of abdominal pain and diarrhœa which persisted until June 5, when became drowsy and incontinent of urine and fæces. At no time did he complain of any muscular pain or tenderness.

Temperature 101° F., pulse-rate 90 and respiration 22. Semi-comatose; could be roused with difficulty but fell asleep again almost at once. No neck rigidity and Kernig's sign negative. Fundi normal. Left arm spastic; knee- and ankle-jerks brisk; bilateral ankle-clonus with extensor plantar responses. Abdominal reflexes all present and equal. Spleen palpable about one finger's breadth below costal margin. No abnormality detected in heart or lungs. On the front of chest and abdomen there were numerous small erythematous areas, and a few tiny purpuric spots were seen on forearms, trunk and soft palate. Under fingernails, particularly on right hand, were rows of small hæmorrhages parallel to free border of nail and just proximal to it.

The patient remained very drowsy and incontinent until June 13, when he began to improve, and by June 21 his mental state was quite normal. Full sphincter control was regained a few days later. The spasticity of the left arm had disappeared by June 15 but on July 5 he had still slight spastic weakness of both legs with extensor plantar responses. The spleen remained palpable until June 30. During the first 8 days in hospital there was a remittent pyrexia up to 100° F. which fell to normal on the 3rd, 6th and 8th evenings. Since then the temperature has been normal.

Investigations.—On admission: red cells 5,100,000 per c.mm.; Hb. 102%; white cells 26,000 per c.mm.; polymorphs 11,440 (44%); eosinophils 10,660 (41%); lymphocytes 3640 (14%). Subsequent white counts:

Date	Total white cells per c.mm.	Eosinophils per c.mm.
June 10 ..	18,000 ..	.. 9540 (53%)
„ 12 ..	16,000 ..	.. 8000 (50%)
„ 18 ..	13,000 ..	.. 2860 (22%)

Blood-culture was sterile, blood Wassermann and Kahn tests and Widal test negative. Blood-sedimentation rate: 21 mm. in one hour (June 21).

C.S.F. normal in all respects. Antigen skin test strongly positive.

CASE 2

Woman of 69, admitted June 16. Illness started on June 6 with tiredness. Next day puffiness of lower eyelids and face was noticed with stiffness on getting out of bed. Later that day became drowsy. June 9: puffiness had disappeared and there was retching after meals. June 10: general condition improved somewhat. June 11: ached all over and moaned all day; that evening she collapsed but did not lose consciousness. For next 96 hours remained drowsy and was at times irrational. On the 13th became incontinent of urine and lost use of both arms; remained thus until admission. No coryza, no cough, no diarrhœa and no constipation.

On admission was grossly obese and very drowsy. Could be roused and responded to simple questions and requests: could state her age and where she lived and could protrude her tongue. Frequently emitted high-pitched cry. Incontinent of urine and fæces. Significant findings: loss of tone in facial muscles; flaccid arms with no voluntary movement or power; biceps jerks present on both sides but supinator and triceps jerks absent; both legs flaccid, particularly right; knee- and ankle-jerks present; bilateral extensor plantar responses; no papillœdema. Systolic murmur heard over whole precordium. B.P. 130/75 mm. Hg. Few petechiæ on volar aspects of both elbows, and sub-ungual "splinter" hæmorrhages very prominent on all ten fingers and on second and third toes of left foot. One big petechia under right big toenail. Bilateral rhonchi and râles. Temperature 98·4° F., pulse-rate 90; respirations 15.

On June 17 temperature rose to 102·4° F., pulse-rate to 130 and respirations to 35. Next day, coma was deeper and the temperature rose to 107° F., pulse-rate 150; Cheyne-Stokes respirations 45 per min. Deepening cyanosis. Following a tepid sponge temperature fell to 102° F.; died half an hour later.

Investigations.—Red cells 5,400,000 per c.mm.; Hb. 102%; white cells 12,000 per c.mm.; polymorphs 7560 per c.mm. (63%); eosinophils 3480 per c.mm. (29%). Whole blood: trichinella embryos detected in large numbers (Dr. Allott). Wassermann and Kahn reactions negative. C.S.F. normal in all respects; no trichinellæ seen.

1. Davis, E. and Allott, E. N. *Lancet*, 1941, **2**.

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Antigen skin test: strongly positive.

Autopsy performed by Dr. Arthur Davies showed the following positive findings. Lungs: Subpleural petechial hæmorrhages, with zones of hæmorrhage in substance of left lung; basal congestion and œdema. Heart and liver: extreme fatty degeneration.

Stomach and uterus: few petechial hæmorrhages.

Right psoas muscle: extensive hæmorrhage into substance (similar findings in a case of fatal trichiniasis were described by Frothingham in 1906).

Prof. R. T. Leiper demonstrated microscopically the presence of a trichinella larva in the tendinous portion of the diaphragm.

Histological examination (Dr. A. B. Bratton). Microscopical examination shows presence of larvæ in voluntary muscle; numerous in tongue, scanty in diaphragm and right psoas muscle; in these sites also foci of inflammatory infiltration shown by serial sections to indicate proximity of a larva in many cases but not in all; such foci present in laryngeal muscles and an intercostal muscle, though sections include no larvæ. Myocardium shows subacute inflammation, mainly focal; serial sections do not show larvæ, even in vicinity of inflammatory foci. Excess of eosinophil leucocytes in sternal marrow. Sections of lung, liver, spleen, kidney, suprarenal, pancreas, gall-bladder, duodenum, uterus, thyroid, frontal, parietal, temporal and occipital cortex, centrum semi-ovale, basal ganglia, pons, medulla and cerebellum show neither larvæ nor inflammatory foci.

COMMENT

The mental attitude of the patients was identical with that seen in encephalitis. It is noteworthy that this is the most fatal form of trichiniasis. "Splinter" hæmorrhages were present under the toenails in one case as well as under the fingernails in both. As far as we know, hæmorrhages under the toenails have not so far been reported in this country. Other notable features were the persistent splenomegaly in case 1, and the detection of the embryos in the blood in case 2, (probably the first time that has been done in this country).

We must thank Dr. W. Allen Daley, medical officer of health, L.C.C., for permission to publish this paper, and Dr. B. A. Young, medical superintendent of St. Alfege's Hospital, Prof. R. T. Leiper, F.R.S., Dr. Arthur Davies, Dr. A. B. Bratton, Dr. E. N. Allott and Dr. E. Davis for their coöperation.

Reviews of Books

Surgery of Modern Warfare

Part V. Editor: HAMILTON BAILEY, F.R.C.S., surgeon to the Royal Northern Hospital, London. Edinburgh: E. and S. Livingstone. Pp. 641–876. 17*s*. 6*d*.

WITH this instalment the book is complete. Wounds of the neck are discussed and the central nervous system is covered by experts in neurology and neurosurgery. A section is devoted to diseases encountered in subtropical countries, another to the administration of casualties in the Navy, the Army and the E.M.S., and an appendix reviews recent articles on war surgery. In the section on the care of the bladder in spinal injuries the author advises suprapubic cystotomy as a routine, a conclusion to which most surgeons of experience are coming. In dealing with burns he shows a reluctance to abandon measures of proven value for such as have yet to stand the test of time. The articles on organisation are excellent, but it is doubtful whether first-aid posts can act as filters, cases being taken there and sorted before being transferred to more fully equipped hospitals. If a patient is ill enough to require an ambulance he should be taken direct to hospital, F.A.P.'s dealing with ambulance cases only when they are isolated or when neighbouring hospitals have been put out of action. Posts near or attached to big hospitals should deal only with walking wounded. The writer on head injuries refers to cerebral compression by bleeding from intracranial veins, without explaining how this can happen with blood at a lower pressure than normal cerebrospinal fluid. The editor reopens the question of tying the vein also when it has been necessary to tie the artery to a limb. The book in fact fairly bristles with controversial matter. A fine level of production has been maintained and here is certainly a standard work in the making.

Medicine and Human Welfare

HENRY E. SIGERIST, M.D., Welch professor of history of medicine in the Johns Hopkins University. London: Humphrey Milford, Oxford University Press. Pp. 148. 15*s*. 6*d*.

"THE study of history is not a luxury," writes Professor Sigerist; but as his 148 pages (including 20 well-chosen illustrations) cost a pretty penny, some may not quite agree with this dictum. However, under his guidance, the study of the history of medicine, if not a luxury, is certainly a pleasure. The subject is approached from the aspects of disease, health, and the physician. Mankind's changing attitude to medicine is surveyed from the earliest religious ideas, through the scientific to the sociological aspect. He describes the salient features of the Babylonian, Assyrian, Greek, early Christian, medieval and modern schools of medicine and relates their development with man's philosophical conceptions of a changing world. His brief sketch is in no sense superficial, for he has used a wide canvas and his sense of historical perspective gives meaning to the realities underlying the illusions that physicians cling to in their profession. Man has gradually become conscious of the need for socialised medicine; advocates of a state medical service will find that L. Mende wrote, as long ago as 1820, that "the state must protect health as its most precious property"; and when we are advised, as human cobblers, to stick to our last, we may gain new inspiration from Virchow who wrote, in 1848, "The Physicians are the natural attorneys of the poor, and social problems fall to a large extent within their jurisdiction."

Professor Sigerist, of course, is writing for an American public, which has as yet no insurance against doctor's bills comparable to our National Health Insurance; but he goes much further than we have done so far in outlining a solution to the sickness problems of the population as a whole—and such problems should be the concern of all true physicians. He is convinced that medicine like education will ultimately become a public service in every civilised country. The scope of medicine has broadened: the doctor is no longer a shaman, priest, craftsman or cleric, and he must be more than a mere scientist. The new physician will be "scientist and social worker, prepared to co-operate in team work and in close touch with the people he serves; a friend and leader, he will direct all his efforts towards the prevention of disease, and become a therapist when prevention has broken down—the social physician protecting the people and guiding them to a healthier and happier life."

Effective Living

C. E. TURNER, A.M., Sc.D., Dr.P.H., professor of biology and public health, Massachusetts Institute of Technology; and ELIZABETH MCHOSE, B.S., M.A., director of physical education for girls, Senior High School, Reading, Pennsylvania. London: Henry Kimpton. Pp. 432. 10*s*.

"To help youth discover ways of effective living" is the avowed purpose of a long and comprehensive book by two American authors. The subject is considered under three heads: effective living for the individual, in the family and in the community. Part I deals with such matters as physical activity, food, social behaviour, care of the skin and teeth; part II with healthful living conditions in the home; and part III with sanitation and public health services. The book is a mine of sound, if perhaps not always very exciting, information; it is profusely illustrated and at the end of each chapter is a searching and formidable questionnaire. Much of the advice given is very proper and sensible. Some young readers may feel that the exhortation not to expect too much of life is a trifle redundant at present while those who worry unduly may feel the need of something more invigorating than "if you have no control over the object of your worry, think of something else." It may well be that effective living is to be achieved by taking thought along the lines advocated in this book; but it is at least equally arguable that this desirable end is often secured by careless souls who never give a thought to the matter at all. Moreover, there is a possible danger that the earnest student might devote so much attention to acquiring the necessary efficiency in living as to leave himself little or no time to live.

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THE LANCET

LONDON: SATURDAY, OCTOBER 4, 1941

COLONIAL WELFARE BEGINS ITS CLIMB

OUR colonial empire, as distinct from the dependencies and mandated territories administered by the dominions, is inhabited by 60 million people, two-thirds of whom live in Tropical Africa and the remainder mostly in the West Indies, Ceylon, Hong-Kong and Malaya. The colonies are administered by more than forty separate governments, and are responsible for an enormous volume of trade: in 1939 the value of exports amounted to more than £4 per head of population, the imports to £3 10*s*. About a quarter of the average expenditure is on social services; but since the revenues in many colonies are small in relation to their size, while the field of social service to be covered is very large, the sum is grossly inadequate. The Earl of LISTOWEL, speaking in the House of Lords on July 9, showed how the principle of trusteeship on which the colonies are held and administered had been disregarded until 1929 when the first Colonial Development Act was passed. Even this was aimed more at relieving unemployment at home than at stimulating production of subsistence crops in the colonies. But last year, with the passing of the Colonial Welfare and Development Act, opportunities for raising the standard of living among the native populations have been greatly increased. This act authorises the expenditure of up to £5 million a year for ten years, with an additional yearly grant of half a million for research. Lord MOYNE, speaking in the same debate, said that but for the war the expenditure authorised might have been much higher. Last year the fall of France made it necessary to convert every available penny into aeroplanes and arms; but this year it is felt that war or no war we must not let the peoples of the colonies—many of whom already live at too low a standard—suffer from the disorganising effects of war. The obligation is the greater because the colonies have been so generous in offering us help, amounting already to more than £20 million. Some have offered their surplus revenues as a gift for the prosecution of the war. Lord MOYNE, uneasy about accepting these generous offers from the poorer colonies, has proposed that they should be accepted as loans, to be repaid in time to come, for post-war development. The effects of the war on the various colonies have been uneven; a few produce materials which are in demand, and they are in a state of unwonted prosperity, especially Malaya and Northern Rhodesia; in others, such as the West Indies, there has been no serious interruption of their usual economy; but a few—especially Malta and Cyprus—are cut off from their ordinary trade; and some have lost their overseas markets through lack of shipping space—West Africa, for example, cannot dispose of cocoa and palm products, East Africa of sisal, Palestine of oranges or Jamaica of bananas. The home government has helped in these difficulties by buying up crops or financing the growers in other ways.

At the outbreak of war there was for a time a tendency towards the arrest of social programmes, but now the aim is to carry on all that were in progress and to plan ahead for others. Much of the personnel, of course, has been seconded for military service, but recruitment has been officially approved and young doctors are advised that service in the colonial empire is of as much national importance as service in the forces. The Mediterranean colonies of Gibralter, Malta, Cyprus and Palestine are in a peculiar position at present and their medical services are necessarily subordinated to war needs. In other colonies schemes initiated before the outbreak of war are still being maintained. In Sierra Leone, for example, a campaign against sleeping sickness and yaws had been newly begun when war broke out and this is being carried on, the cost of it being £50,000 for three years. In the gold fields an attempt to get rid of onchocerciasis by evacuating the area for a time was found to be holding up gold production seriously; Mr. J. J. C. BUCKLEY, D.Sc., of the London School of Hygiene and Tropical Medicine has been seconded there and is making progress in the study of the simulium fly responsible for spreading the disease. In Nyasaland Dr. B. S. PLATT, a member of the staff of the Medical Research Council, directed a team to make a nutritional survey, and this piece of work has been continued although on a diminished scale. The M.R.C. have also coöperated in other directions, and Dr. FRANK HAWKING and Dr. A. J. HADDOW holding M.R.C. fellowships for research in tropical medicine worked in Tanganyika and in Kenya. Dr. E. M. LOURIE, a member of the M.R.C. staff, has been carrying on research in chemotherapy in connexion with the sleeping-sickness survey in Sierra Leone which is being conducted by the local government with a grant from the Colonial Development Fund. Prof. D. B. BLACKLOCK of the Liverpool School of Tropical Medicine, and Dr. CARMICHAEL WILSON of the Colonial Medical Service, are carrying out an investigation at Freetown into the occurrence of malaria there. Dr. G. M. FINDLAY of the Wellcome Research Institute has recently made tours in East and West Africa and the Sudan to study the incidence of yellow fever, and has made reports and suggestions. He has emphasised the need for further research and coördination in the African territories. Much investigation has also been going on at Entebbe under Dr. A. F. MAHAFFY of the Rockefeller Foundation, the unit there having been established for several years. Many public-health measures to be effective must be on a massive scale; for example, a sleeping-sickness campaign is going on in Nigeria, where a fly-free belt is being created some 70 miles long and 20 miles wide—the size (say) of Salop or Wilts. The first part of the work entails the destruction and clearance of jungle and undergrowth and is thus a considerable task. It represents one aspect of a settlement scheme, with the provision of safe water-supplies, of sanitary latrines, and of clean markets for meat and food. In Tanganyika a central development committee has been established and the study of trypanosomiasis and the tsetse fly is going on. In Northern Rhodesia a plan for establishing rural dispensaries is being continued, a new maternity block, the gift of the Beit trustees, and a pathology laboratory have been opened, and there is provision for more hospitals. In British Guiana the spread of malaria and yellow fever is being investigated, with

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support from the Rockefeller Foundation. Thanks to the work of Sir FRANK STOCKDALE, comptroller of development and welfare to the West Indies, and his experts, a preliminary survey of nearly all the West Indian colonies is already available and plans are being put forward for various new schemes; numerous health units are being started in all these colonies. Similar health units—designed to educate people in hygiene as well as to treat them—are being planned elsewhere: Ceylon has been a pioneer in this direction. Sir FRANK has also visited St. Helena, where housing is being improved and he has advised on the production of crops there. In Hong-Kong there has been a large reorganisation of Chinese hospitals.

Thus, taking it all round, the health and welfare services of the colonies have not been allowed to drift backwards since war broke out. At the moment developmental work which requires imported machinery or essential war materials cannot be undertaken, owing to difficulties of supply and shipping and because personnel is difficult to obtain; but everything is being done to increase local industries in the colonies, to get them to undertake production of their own necessities, and to extend their internal markets. They are to be encouraged to grow more foodstuffs of the right kind and to improve housing and sanitation; meanwhile the training of agricultural demonstrators, health workers and others to educate the community in matters affecting their social well-being is also proceeding. All this will help to raise the standard of living. Moreover Lord MOYNE is encouraging the colonial governments to put forward any schemes for development, especially in social welfare, which do not require imported material, and is able to assure them that the money to finance them will be forthcoming. He is specially anxious that schemes for development should be drawn up which can be put into action as soon as the war ends. Some schemes have been approved under the new act; many others are under consideration; where war exigencies allow, these no doubt will be approved. This may well be the beginning of a new era in colonial government which will end for ever the charge of our enemies that our colonies are neglected estates.

THE BIOPSY

THE premature death of the Emperor FREDERICK is said to have altered the whole course of modern European history, and there is no doubt that his death from laryngeal carcinoma was accelerated because more attention was paid to VIRCHOW'S negative biopsy reports than to ERNST VON BERGMANN'S clinical impression of malignancy, so that operation was delayed. Even now, after fifty years, the limitations of biopsy have not been clearly defined and the pathologist's colleagues too often rely either too much or too little on the help he can give in diagnosis. Lately surgeons, radiotherapists and pathologists have put forward their views on the value and technique of biopsy at the Faculty of Radiologists. A biopsy may be required to determine the nature of the disease process; or, if that is known, to ascertain its character and so assess the best form of treatment and the prognosis; or it may be used to observe the response to treatment. Even though there is seldom more than a 15% difference between expert clinical and histological diagnoses the conference agreed that a biopsy is an expedient and almost essential preliminary to treatment, but there was much discussion as to the form it should take.

In small lesions of the skin, mouth and breast, where the lesion is reasonably accessible and of such a size that complete local excision can be achieved this is the method of choice. In extensive lesions, where a biopsy can only remove a portion of the tumour, discretion is needed. If the growth is ulcerated there is little danger, though the surgeon may merely remove necrotic material impossible to interpret. In cases of suspected melanoma and anaplastic growths an incisional biopsy is not advisable, and as a rule the endotherm cutting current is preferable to the scalpel. It is well that in this country pathologists have educated surgeons away from the rapid frozen section. When there is considerable doubt about the nature of the condition an experienced pathologist should be in the theatre, but if he cannot make up his mind on the naked-eye appearances of the tissues in situ or when excised it is doubtful if an imperfectly fixed frozen section will help him, and it is better to wait a short while until an adequate preparation can be made. It is true that good preparations can be made in from 30 seconds to 6 minutes, but these methods are seldom adequate for the difficult case; there are numerous tricks which can be employed to accelerate the production of satisfactory sections, many of which are described in a new book by KRAJIAN.[1] In regions not readily accessible to direct excision it is usual to use biting forceps and excise a portion of the growth. This is the routine method employed for growths of pharynx, bronchus, œsophagus, rectum and bladder, but it is open to the disadvantage that a very small fragment is removed, difficult to interpret and not always from the most suspect area.

In deep-seated lesions there is a further possibility—the aspiration biopsy. This method was first used by KÜSS[2] in 1847 but was reintroduced about ten years ago and is gaining favour as a simple outpatient procedure. The technique is simple: the skin area is infiltrated with local anæsthetic or a small dose of Evipan is administered and then a syringe with a wide bore (No. 18) needle is introduced into the tumour; the piston is withdrawn fully and the needle pressed further into the tumour; the direction of the needle is then changed to cut off the column of tissue in the needle, the tension on the piston released, and the syringe withdrawn. The thread of tissue may then be smeared on a slide and treated by Dudgeon's method[3] or embedded in paraffin and sections prepared. The advantages of the technique are obvious and the dangers apparently slight, but it requires close collaboration between the surgeon and pathologist. BARRINGER[4] and MCGAVIN[5] have advocated its use in the diagnosis of prostatic carcinoma, while RUSSELL and CAIRNS[6] have proved its value in cerebral pathology where the Dudgeon smear method enables a diagnosis to be made in a matter of minutes. At the Radiologists' conference, both Dr. FRANK ELLIS and Mr. T. A. GREEN strongly supported it, and ELLIS claimed that it would give reliable results in 70% of cases, though from his figures it is not clear what proportion of cases in which an unsatisfactory or negative aspiration was obtained were subsequently shown to be malignant. When it is impossible to

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obtain material by aspiration a punch biopsy with the aid of a trocar may be used and GREEN has devised a modification of this instrument which seems to have some advantages. These methods seem unfortunately to be least satisfactory in breast tumours; indeed CUTLER[7] has said that the hazards and uncertainties of the technique do not justify its use in the diagnosis of borderline breast tumours. Sternal-marrow and splenic puncture are used to good effect by the hæmatologist and to an increasing extent by the bacteriologist, but the dangers of hepatic biopsy[8] outweigh its value and the "ponction triple" of EMIL WEIL has not found many supporters. Nor can aspiration be recommended in lymph-node enlargements, although good results have been claimed; for a satisfactory interpretation of a lymphadenopathy it is essential to have a node from a site of election carefully excised and prepared and examined by the best histological technique. Lately VAN ORDSTRAND and LAMBERT[9] have urged the more extensive use of aspiration biopsy in non-tuberculous infective lesions or neoplasms of the lung and pleura. Turning to uterine pathology, cervical tissue is removed by cautery or biting forceps, and in most hands Schiller's iodine test has not proved reliable; in the uterine cavity curettage has been in use since the days of MUNDÉ, yet the suction curette[10] which has reduced the operation to an outpatient procedure without decreasing its diagnostic accuracy has not yet received the support it deserves. The battle has been waged most furiously in the realm of bone pathology. YOUNG[11] decides strongly in favour of an open biopsy of adequate size in every case of suspected bone sarcoma, and has shown by experiment that aspiration methods are perilous as well as giving uncertain results.

The biopsy having been achieved and the tissue judged to be malignant, the pathologist has then the responsible duty of assessing its degree of malignancy and probable response to treatment. His opinion cannot rest on cytological criteria alone but must be guided by his knowledge of the natural history of that particular type of growth in that situation. This requires close collaboration between the laboratory and the follow-up clinic, and it is to be hoped that this aspect will be considered by local authorities when they are implementing the Cancer Act. The statistics being collected by the clinical cancer committee of the British Empire Cancer Campaign will prove of great value in this respect and no doubt correct many vague clinical impressions. Nevertheless, cytological analysis is of considerable value and many forms of classification have been suggested; that of BRODERS[12] is the most widely used and forms a useful histological shorthand. CATHIE[13] brought forward experimental and clinical evidence to suggest that the amount of residual ash in a microincinerated section was a reliable index of the radio-sensitivity of neoplastic cells and this method of assay should be further investigated. At the Faculty of Radiologists Dr. F. G. SPEAR described a method in which the proportions of resting, dividing, differentiating and degenerating cells at the growing edge of the tumour are assessed and he suggested that they might prove a useful index of the response to radiotherapy; this is clearly a rational method of measurement but must be laborious if it is to be reliable.

The risks of biopsy must be borne in mind. The danger of causing metastases by neoplastic cells forced into lymphatic or vascular channels has been exploded by both clinical and experimental experience; though there is a possibility of implanting neoplastic cells in the healing scar of an incisional biopsy, yet if the tumour is found to be malignant then a radical operation should follow before this can be significant. There is, however, a psychological risk in an incisional biopsy; the patient may agree to this and yet refuse the second radical operation in spite of all advice and procrastinate until a radical operation is impossible. The difficulty is unlikely to follow the comparatively simple aspiration biopsy, and although implantation along the track is possible this can be reduced if a diathermy punch is used. The chief danger of the aspiration biopsy is hæmorrhage either into the tumour itself or as the result of puncture of an adjacent vein; this may be serious and is always alarming, yet it is the experience of those who execute the method that it is relatively infrequent.

It is clear that the aspiration biopsy or an analogous procedure should be used more freely, but before a surgeon resolves to try this diagnostic method he should consult with his pathologist to ensure that the specimens are submitted for examination in a suitable manner; otherwise he may be disappointed.

1. Krajian, A. A. Histologic Technic, London, 1941.—2. *Union méd.* April, 1847.—3. Dudgeon, L. S. and Barrett, N. R. *Brit. J. Surg.* 1934, **22**, 4.—4. Barringer, B. S. *Surg. Gynec. Obstet.* 1936; **62**, 410.—5. McGavin, D. *St. Bart's Hosp. Rep.* 1938, **71**, 209.—6. Russell, D. S., Krayenbühl, H. and Cairns, H. *J. Path. Bact.* 1937, **45**, 501.—7. Cutler, M., Burschkè, F. and Cantrell, S. T. Cancer: Its Diagnosis and Treatment, London, 1938, p. 36.—8. See *Lancet*, 1939, **1**, 996.—9. Van Ordstrand, H. S. and Lambert. T. H. *Cleveland Clin. Quart.* 1941, **8**, 175.—10. Lorincz, B. and Davis, A. *Brit. med. J.* 1939, **1**, 261.—11. Young, J. S. *Ibid*, 1937, **2**, 647.—12. Broders, A. C. *Minn. Med.* 1925, **8**, 726.—13. Cathie, I. A. B. *J. Path. Bact.* 1939, **48**, 1.

Annotations

VALUE OF RABIES IMMUNISATION

THOUGH genius by its intuition may open up limitless fields for discovery it may at times clog the wheels of progress, for the disciples of a genius are too ready to regard any questioning of the master's words or deeds as sacrilege. Thus until the last few years, and despite the fact that it has been practised all over the world, there has been no serious attempt to determine whether antirabic immunisation is really of any value. On July 6, 1885, Pasteur announced the successful use of a prophylactic vaccine on a boy, Joseph Meister, who had been bitten fourteen times by a mad dog. The scene has been immortalised by the statue which now stands in the gardens of the Pasteur Institute in Paris, but Meister's cheery smile will no longer greet those who seek their letters in the concierge's lodge, for Meister committed suicide soon after the German occupation. The institute's figures show that the fatality among the treated patients fell from 0·9% in 1886 to 0·3% in 1890; it varied between 0·2 and 0·35% for the next 30 years, while since 1922 it has been zero, except in 1924.[1] According to McKendrick's reports[2] from various Pasteur institutes the fatality from rabies after vaccination with various vaccines has ranged from 0·23 to 0·49%. Denison, McAlpine and Gill[3] reported 21 fatal cases of rabies among 34,864 vaccinated people in Alabama (0·06%) from 1922 to 1936. On the other hand, it is possible that the value of the Pasteur treatment has been

1. Cruveilhier, L. and Viala, C. *Ann. Inst. Pasteur*, 1932, **60**, 661.
2. McKendrick, A. G. *Bull. Hlth Org. L.o.N.* 1937, **6**, 17; 1938, **7**, 1; 1940, **9**, 31.
3. Denison, G. A., McAlpine, J. G. and Gill, D. G. *Amer. J. publ. Hlth*, 1937, **27**, 869.

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overestimated. Denison and Dowling[4] for instance, reported 48 cases of rabies in nearly half of which prompt and adequate prophylactic treatment had apparently been given. Ratcliffe[5] found that of 40 fatal cases of rabies 12 had received Pasteur treatment. Yü[6] has lately recorded that from July, 1923, to August, 1940, 383 patients attended the medical department of Peiping Union Medical College because of dog bites; of this series 201 were vaccinated and 182 were not, either because they refused or because they were bitten by dogs which were proved to be normal. Among the 201 vaccinated people there were 9 (4·5%) cases of rabies; among the 182 unvaccinated 18 (9·8%). In 2 of the vaccinated people in whom rabies developed vaccination was started a fortnight after the bite, possibly too late. The failure of the immunisation could not in the others be ascribed either to delay in treatment or to severity of the wounds; neither could the viruses obtained be identified as reinforced viruses in the sense used by Koritschoner, although in all the cases the first symptoms appeared within 14 days after inoculation and the viruses isolated became fixed after from 3 to 10 passages. Even when no cases of rabies develop the value of the Pasteur treatment is not absolutely proved. Thus in Shanghai Lieou[7] reported that 402 complete Pasteur treatments were given from 1937 to 1939; no case of rabies was observed. However, of the supposedly rabid animals 249 were definitely proved to be free from rabies, 106 were suspected on various grounds of having rabies, 10 had clinical symptoms of rabies and only 37 were proved experimentally to be rabid. Of the 37 people who were associated with the animals proved to be rabid only 17 were actually bitten, 9 had had their hands covered with saliva and 11 were licked by the rabid dogs. It is known that rabies can be contracted by contact with the saliva of a rabid animal but there is little or no evidence to show how often this happens, while according to Kelser[8] only about 25% of people bitten by rabid dogs actually develop rabies. It seems then that in less than 5 out of 402 patients is there any actual proof that rabies was prevented. Similarly 442 people received the Pasteur treatment in Paris in 1937 but in only 2 instances was the diagnosis established by histological examination of the dogs' brains. Before the value of the Pasteur treatment can be fully assessed much further work will have to be carried out both experimentally in the laboratory and in man. Statistics must be based only on cases which can be proved to have been bitten by rabid animals, while the characteristics of the viruses isolated must be carefully studied. If after thorough investigation the present method of immunisation is found to be inadequate it should be scrapped. Pasteur would be the first to encourage us to find a better.

JOINT RENOVATION

ANY contribution is welcome that tends to lessen the feeling of helplessness in dealing with severe osteo-arthritis. Magnuson's[9] results with operative treatment based on purely mechanical considerations are particularly encouraging. He confirms the experimental findings of Bauer and Bennett[10] that the pathological changes are probably the result of frequent minor traumata and that the typical marginal exostoses are produced in the effort to stabilise a joint which has suffered ligamentous injury or damage to articular cartilage. Once these exostoses are formed they limit movement and a vicious circle of recurrent trauma and new peripheral bone formation is set up. Clinically, operation aiming at complete removal of mechanical irritants from the joint surfaces was performed on 62 cases with entire relief in 60; no formal synovectomy was carried out since this does not appear to be called for in non-rheumatoid cases. In the hip, where old Perthes's disease or slipped epiphysis is often the primary lesion, removal of marginal osteophytes and the overhanging acetabular lip gave gratifying results; in the elbow, after wide exposure with reflexion of the olecranon, the smoothing down of transverse ridges lying in the sigmoid notch was often necessary. The knee was most commonly involved and an extensive toilet is advocated in which the condylar margins are excised, all degenerated cartilage removed down to firm fibrocartilage or eburnated bone, the menisci dealt with if injured, and the patella shaped with the chisel to glide unobstructed between the femoral condyles. Movement was begun on the fourth post-operative day, with gentle passive encouragement and muscle re-education, and weight-bearing by the tenth day. It is then of cardinal importance for the patient to hold the joint quite straight and to use sticks only; the pain of walking on the slightly flexed knee or the use of crutches will defeat the surgeon's endeavours. Magnuson's results give point to the observation of Kelikian[11] that trauma and trauma alone is the primary affection of articular cartilage and that metabolic or endocrine factors are only secondarily associated with osteo-arthritis. They are encouraging, too, since operations of this type, as opposed to arthrodesis or arthroplasty, have not been very popular. It may well be that such a careful removal of mechanical irritants is better than a formal synovectomy or capsulotomy, or the casual removal of osteophytes; but the operation is not a minor one and, unless the patient gives whole-hearted coöperation, may leave him worse than before.

FIBROIDS

IN reviewing the cases of myomata treated in their wards Mahfouz and Magdi[12] of Cairo discuss almost every aspect of this common tumour including the history of its surgery. Avicenna in the 11th century described and advocated the excision and avulsion of vaginal polypoid myomata with or without ligation of the pedicle, and he seems to have been the first to approach the problem of myomata from a purely surgical standpoint. All sorts of procedures were tried by the earlier surgeons, including ligation of the uterine vessels and ovarian castration, in an effort to diminish the blood-supply to the tumour. The name of Lawson Tait will always be associated with this latter procedure; he claimed that the "whole merit of the thing, however much or little it may be, belongs to British surgery," for there was considerable competition from the United States and the Continent to establish a prior claim for its invention and successful performance. Tait's first successful ovarian castration was performed in 1872. A few years before this, in 1863, Spencer Wells had performed the first two abdominal myomectomies, and in the same year Charles Clay of Manchester performed the first successful supravaginal hysterectomy in Europe. Clay ligated the whole uterine stump with three strands of Indian hemp and only took fifteen minutes for the whole operation. The patient left hospital 35 days later.

In their series of 931 cases of myoma all treated by operation Mahfouz and Magdi note some interesting facts: 86% were multiple, 14% single; 58% intramural, 24% submucous and 18% subserous; only 2% were cervical in situation. Ovarian cysts were associated in 16% of their cases and inflammatory disease of the adnexa in 28%. This latter complication they regard as a serious one in that it considerably increases the fatality, the commonest cause of death being peritonitis in 52% of

4. Denison, G. A. and Dowling, J. D., *J. Amer. med. Ass.* 1939, **113**, 390.
5. Ratcliffe, A. W. *Arch. intern. Med.* 1940, **66**, 478.
6. Yü, T. F. *Chin. med. J.* 1941, **59**, 326.
7. Lieou, T. C. *Bull. med. Université L'Aurore*, 1940, **5**, 84.
8. Kelser, R. A. Harvard Symposium on Virus and Rickettsial Diseases. Cambridge, Mass. 1940. P. 642.
9. Magnuson, P. B. *Surg. Gynec. Obstet.* 1941, **73**, 1.
10. Bauer, W. and Bennett, G. A. *J. Bone Jt Surg.* 1936, **18**, 1.
11. Kelikian, H. *Surg. Gynec. Obstet.* 1940, **71**, 416.
12. Mahfouz, N. P. and Magdi, I. *J. Obstet. Gynæc.* June, 1941, p. 293.

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the fatal cases. Axial rotation of the tumour occurred in 5 patients, the cause being a pedunculated subserous fibroid. Various degenerations were noted in 18% of the tumours removed and red degeneration in 6 cases. In 3 cases the tumours had become detached entirely from the uterus and gained a new parasitic foothold on the omentum. Malignant degeneration was encountered in 3 cases—a low incidence, for in England the generally accepted figure is 1%. The operations performed were: subtotal hysterectomy in 459 cases with 9 deaths; abdominal myomectomy in 362 cases with 5 deaths (a very creditable achievement, for myomectomy in this country is recognised to carry a fatality of 5% and subtotal hysterectomy 2%); vaginal myomectomy in 93 cases with 4 deaths (this high fatality is explained by the large infected masses impacted in the vagina after years of ill health and hæmorrhage); and finally total hysterectomy in 18 cases with 3 deaths (a high figure, explained as due to tubo-ovarian infection resulting in peritonitis). The number of myomectomies is large. The reason for this in Egypt is largely a social and religious one, for fertility is of tremendous importance there, but at the same time it does the surgeons concerned great credit for holding a conservative outlook. Here Victor Bonney has preached just such a doctrine for years. Its soundness is illustrated by one of the cases in the Cairo series, a woman of 38, married ten years without issue, in whom they enucleated 52 myomata. This lady was 16 months later delivered of an heir. How many surgeons would have sacrificed the uterus? Mahfouz and Magdi put the recurrence figure after myomectomy at 5%. They regard the operation as dangerous if the cavity of the uterus has to be opened or if multiple incisions are needed for the enucleation of many tumours. The incidence of stump carcinoma in the cervix after subtotal hysterectomy was nil. The work of these two surgeons is a strong plea for conservatism and a wider adoption of myomectomy whenever myomata are encountered in a uterus that is still potentially capable of being impregnated. They undoubtedly favour the subtotal operation as against the total in hysterectomy and this will give many English and American gynæcologists food for thought.

MEDICAL REPORTS AND CERTIFICATES

THE legal position and usual practice with regard to medical reports and certificates is succinctly set out in memorandum No. 156, issued by the Central Bureau of Hospital Information.[1] Legally neither a hospital nor its medical staff is obliged to give reports or certificates to any third party outside. The only legal method of extracting information from the medical officer is to subpœna him to give evidence in a court of law. This does not oblige him to say anything to anyone outside the court, and even in court he can object that the information is confidential, although the tribunal may decide to overrule his protest that disclosure would be a breach of professional secrecy. The patient's consent should always be obtained before giving a report or certificate; one large London hospital refuses all reports unless application is made on a particular form (appended to the bureau's memorandum); this form contains a space for the patient's express consent in writing.

The memorandum usefully sets out the usual practice about fees. Hospitals generally allow a medical officer to receive the fee charged for a report; they sometimes collect the fee for him. The fee does not commonly exceed two guineas; it may be less (according to the circumstances or the patient's means) or nothing at all. In road-accident cases one large London hospital charges a fee of two guineas to an injured patient who wants a medical report to support his claim for compensation. This fee is collected only if the claim succeeds (presumably because in that case the plaintiff recovers it from the defendant); it is then handed over to the medical officer who made the report; if the claim fails the hospital itself pays the doctor a fee of 10*s*. 6*d*. Where a patient wants a medical certificate in order to recover newspaper insurance compensation, the fee is usually 5*s*., as the amount recovered is small. Where a medical certificate (usually the confirmatory certificate) is given by a hospital medical officer under the Cremation Regulations, the usual fee is a guinea. It may be recalled, in passing, that regulation 8 of the 1930 regulations, requiring certificates from the deceased's medical attendant and the confirmatory certificate from another practitioner, is suspended by Defence Regulations where the registrar has certified that death has been registered as due to war operations. Hospitals sometimes charge 1*s*. for "admission and discharge" certificates; more often they are given free. Nor is it usual to charge for an "unfit to work" certificate. Forms of "unfitness to work" and "admission and discharge" certificates are appended to the memorandum. There is also a simple form of general information certificate. This is useful where a rough idea of the disability is needed, rather than the medical details—for example, where a workman is in hospital and the employer wants to know whether the injury is so serious that another workman had better be engaged in his place.

1. Obtainable from the director of the bureau, 12, Grosvenor Crescent, S.W.1. 3½*d*. post free.

HISTIDINE AND HISTAMINE

SUBSTANCES which give specific chemical reactions are much more easy to follow and investigate than those which do not, and this generalisation is well illustrated by the amino-acids. Most of those with closed rings or unusual chemical groupings in their molecules can be induced to react in some way which betrays their presence whatever the circumstances, and this has favoured their isolation and investigation. Those with straight chains are much more difficult to characterise, and, although progress is always being made, much less is known about their occurrence and distribution. Indeed threonine was only detected, and that quite recently, because an elaborate investigation led to the discovery that rats would not grow on a synthetic mixture which did not contain it. The amino-acid which is known to the biochemical fraternity as histidine and to their purer chemical cousins as β-iminazole-α-aminopropionic acid gives colour reactions with bromine which enable it to be detected and estimated in minute quantities in the body fluids; and histamine, the primary amine formed from it by decarboxylation, has equally striking pharmacological properties by which it can be traced. Both these substances have been stated to occur in urine, and their presence there has recently been proved by elaborate checking and rechecking of the methods by which the compounds were first detected and estimated. It has been shown that histidine[1] is a constituent of normal urine, and up to 80 mg. per 100 c.cm. have been found there. Larger amounts are excreted during pregnancy. The quantity depends partly on the subject and partly on the food, and although there are other factors regulating this excretion which have not been exactly defined the histidine appears soon after conception and its elimination seems to be related in some way to the increased excretion of the gonadotropic hormones. Pregnant animals do not excrete histidine in this way—a good example of the biochemical differences which exist between animal species and add such zest to comparative physiology. During the severe toxæmias of pregnancy histamine is excreted; it must be formed from histidine, but why the toxæmias should bring about the appearance of this highly reactive body, and whether it plays any part in the production of the toxæmic syndrome is still obscure. It is evident that we have still much to learn

1. Racker, E. *Biochem. J.* 1941, **35**, 667; Kapeller-Adler, R. *Ibid*, p. 213.

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about histidinuria and histaminuria; and furthermore, we know nothing at all about the excretion of all those other amino-acids which we cannot readily detect and estimate. Taking the normal range of histidine excretion to be up to 80 mg. per 100 c.cm. of urine, this amounts to more than 1 g. per day—quite a large quantity of a valuable and essential bodily constituent. We know of no syndrome due to histidine deficiency, but this rate of loss suggests that such a thing is not inconceivable.

FRACTURED MANDIBLE

IN the last war and up to now in the present one the treatment of fractures of the mandible at or posterior to the angle has presented insurmountable difficulties when the patient has no teeth. Here, as in other fractures, correct apposition of the ends of the broken bone is the first essential to bony union, and such apposition is very difficult to attain because when the fracture is far back in the region of the last molar the small posterior fragment is drawn upwards and inwards towards the midline by the pterygoid and temporal muscles. The many ingenious appliances so far devised have mostly failed to keep the ends together, so that the patient has been left with fibrous union and deformity. Moreover, they usually entailed immobilisation of the jaw leading to difficulties in feeding and delayed union from prolonged lack of function. Last November Vaughan Tomey suggested to the central counties branch of the British Dental Association in Birmingham that external splinting might be feasible, and the two papers published in this issue demonstrate that it is. Dr. Pohl grips the fragments with hook-screws of his own design and welds the screws together by an external metal bar. Mr. Rainsford Mowlem and his colleagues at Hill End maxillo-facial unit use crossed Kirschner wires inserted into each fragment, and fix them by an external clamp. Pohl has applied his technique to one case; the other has been used in 19. Both have the advantage of allowing some measure of mastication as soon as the splint is applied.

A SOCIAL DIAGNOSTICIAN

DIAGNOSIS must come before treatment, and in his second examination[1] of the symptoms of social ill in York, Mr. Seebohm Rowntree once more, as in 1899, diagnoses poverty as their cause. In his preface he disclaims any wish to prescribe for the disease, contenting himself with a masterly picture of the syndrome. He discusses the remedies that lie to hand, but leaves the choice of treatment to others. He has made his diagnosis on the result of a house-to-house visitation of over 16,000 families—almost the whole working-class population of York—and in a chapter, which he modestly assumes will interest only the statistician, he compares his figures with those which might have been obtained by the more usual sampling methods. Mr. Rowntree's technique gives an objective picture of the economic situation of the city, of its housing, of its public-health and education services, and of the leisure-time habits of its inhabitants. He found that the proportion of the working-class population living in abject poverty has been reduced by more than half since 1899, but that rather more than half of the working-class children under one year of age were still living below the poverty line; 47% of them would probably remain in poverty for five years or more, and 31% for ten years or more. Yet Mr. Rowntree's standards of poverty are not indulgent. He has taken as his criterion for a man and wife with three children a minimum income of 43*s*. 6*d*. after rent and rates are paid.

But during the last forty years there has been progress as well as poverty. Housing in York shows a persistent upward trend, and both social and public-health services have increased to a remarkable extent. The chapter on health records a fall in the general death-rate of a half, and in the infant mortality of two-thirds, but even so the infant death-rate was nearly twice as high in the poorest class as in the highest class of those investigated. Reduced working hours combined with increased facilities for recreation have led to widened activities and interests for workers of all ages. Less money is spent on drink, but the enormous growth of gambling has created a new "Public Enemy No. 1," and in these circensian days Mr. Rowntree urges that leisure should be a time of re-creation and not escapism. Andrew Lang is reputed to have said "Many use statistics as a drunken man uses a lamp-post—for support rather than for illumination," but Mr. Rowntree has used them as a searchlight on the murky limitations which poverty imposes on the life and health of our people.

1. Poverty and Progress. London: Longmans, Green and Co. Pp. 540. 15*s*.

RETINAL DYSTROPHY

THE Lawrence-Moon-Biedl syndrome is a rare inherited condition in which small stature, hypogenitalism, obesity, retinitis pigmentosa, polydactyly and mental defect are associated. The genetics of its inheritance are highly involved, and the evidence available is not enough to establish the gene abnormality that underlies it. R. W. B. Ellis and F. W. Law[1] record an incomplete example of the full syndrome—an obese undersized child of normal intelligence, with hypogenitalism and retinal changes. Mental defect and polydactyly were lacking in her case, but a maternal uncle had a supernumerary digit and a sister was mentally defective. These observations alone will hardly make the genetic picture clearer, though they may be set alongside Sorsby, Avery and Cockayne's observation[2] of "the frequent occurrence of one or more components of the Lawrence-Biedl syndrome in the ascendants of patients showing the full syndrome." Ellis and Law describe the retinal defect in their case in some detail. The retinæ appeared thin, especially at the maculæ, which were atrophic. The choroidal vessels were easily seen. There was general deficiency of retinal pigment, but a number of plaques or veils of pigment, varying in size up to twice the diameter of a disc, were scattered over the retinæ, lying at about the level of the retinal vessels, and there was a peppering of the macular area with pigmentary dots. These appearances bear no resemblance to what is commonly called retinitis pigmentosa, although they agree fairly closely with Lawrence and Moon's description of their original cases. In other published records considerable variation in the retinal appearances is found, but few of the accounts approximate to that of typical retinitis pigmentosa. Ellis and Law therefore suggest that, for the sake of precision in terminology, the term retinitis pigmentosa, applied to a component of the Lawrence-Moon-Biedl syndrome, be dropped and "retinal dystrophy" be used instead. They quote Lawrence and Moon who said (in 1886) "In calling these cases by the name of retinitis pigmentosa, we have been guided rather by usage than by the intimate nature of the cases."

Sir GIRLING BALL has been appointed a member of the Shakespeare Committee in place of Sir Alfred Webb-Johnson, who retains his membership in the capacity of president of the Royal College of Surgeons.

A LUNCHEON party at Grosvenor House on Monday celebrated the 21st anniversary of the opening of the Tavistock Clinic, where the first patient was received on Sept. 27, 1920. Since that day 14,700 patients have been treated at the clinic in Tavistock Square, in Malet Street, and since the outbreak of war at Westfield College, Hampstead. Colonel J. R. Rees, the medical director, said that these patients had come from every county in Britain.

1. *Arch. Dis. Childh.* 1941, **16**, 105.
2. Sorsby, A., Avery, H. and Cockayne, E. A. *Quart. J. Med.* 1939, **8**, 51.

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Special Articles

NUTRITION OF RURAL CHILDREN IN WAR-TIME

DAGMAR CURJEL WILSON
M.D. GLASG., M.R.C.P., F.R.C.O.G., D.P.H.
WOMEN'S MEDICAL SERVICE, INDIA (RETD.)

In December, 1939, and January, 1940, I obtained records of the state of nutrition of a group of children who might be expected to continue to live in the same neighbourhood. It seemed possible that war-time diet might prove detrimental to health, and that such records would prove useful for comparison. Schools were chosen for the survey since growing children show evidence of dietary deficiency more readily than adults. Children of rural Oxfordshire were selected as suitable, children from the evacuated areas being carefully excluded.

Overcrowding of the schools by evacuees hampered examination, so the tests used were limited to those which previous nutritional surveys[1] had shown to give close correlation with nutritional deficiency. The following definite and easily recognised signs of vitamin deficiency were sought: follicular hyperkeratosis (phrynoderma); xerophthalmia and keratomalacia; angular stomatitis (cheilosis); congested gums (purple discoloration or bleeding); rickets (including the lesser degrees of enlarged epiphyses and bossing). Assessment of the state of nutrition was also made according to the standards of the Board of Education (Health of the School-child, 1937). Such assessment is largely subjective, but when all the children are examined by the same observer results are obtained which are useful for comparison. Dental observations (decayed, missing and filled rates) were made and special points of clinical interest were also noted.

Visits were paid to 41 different places in Oxfordshire; 1568 children were examined, 531 aged 6–7 (group A), 508 aged 10–11 (group B) and 529 aged 13–14 (group C). Fourteen months later the same schools were revisited; some children had meantime moved to senior schools and others had left school on reaching the age of 14, but it was possible to examine 499 children again—316 in group A and 183 in group B. The numbers of group C remaining were too few to justify comparisons. The results of the two surveys are compared in table I.

TABLE I—STATE OF NUTRITION OF 1568 SCHOOL-CHILDREN IN DECEMBER, 1939, COMPARED WITH THAT OF 499 OF THEM IN FEBRUARY, 1941

Group	When examined	Total	Boys	Girls	Signs of vitamin deficiency: Phrynoderma	Xerophthalmia	Cheilosis	Congested gums	Rickets	Nutrition: Excellent	Good	Subnormal	Bad
										%	%	%	%
A*	Dec. 1939	531	260	271	..	..	4	..	27 (5%)	32	58	10	0
	Feb. 1941	316	145	171	..	..	1	..	6¶ (1·8%)	29	58	12	0
B†	Dec. 1939	508	259	249	..	..	5	..	19 (4%)	29	59	12	0
	Feb. 1941	183	95	88	..	..	3§	..	..	35	53	12	0
C‡	Dec. 1939	529	286	243	..	..	4	..	9 (1%)	37	57	5	0
	Feb. 1941	Too few to permit of comparison.											

* A (aged 6–7 in Dec. 1939). † B (aged 10–11 in Dec. 1939).
‡ C (aged 13–14 in Dec. 1939). § All new cases. ¶ 3 new cases.

If the 499 children who were examined twice are considered separately, there is no evidence of significant deterioration in their nutrition after fourteen months; that is, there has been no increase in signs of vitamin deficiency and no falling off in the state of nutrition as assessed by the same observer. At the outset and during the period of inquiry the existence of a slight degree of dietary deficiency was indicated by the occurrence of cases of cheilosis and of low grade rickets, but the incidence of these did not increase significantly (table II). Indeed, although the number of cheilosis cases was slightly higher at the second examination the number of cases of rickets was noticeably lower, even allowing for the expected decrease in signs of rickets with advancing age of the child. It seems probable that more signs of deficiency would have been found but for the widespread adoption of the county school-milk scheme. Throughout the investigation most of the children were receiving ⅜–½ pint of milk daily in school, an amount which though not sufficient to ensure a high standard of health might prevent open clinical signs of deficiency.

During the inquiry visits were paid to the homes of families in different villages. It was found that the diet of some of the poorest households had actually improved, thanks to more regular wages or allowances received by the father on changing from low-grade agricultural work or casual labour to war-time duty. Inquiry in the homes of rachitic children showed that they belonged to large families where the mother had apparently given up the struggle of trying to make ends meet satisfactorily on a low income; often more than one child showed signs of rickets.

TABLE II—INCIDENCE OF RICKETS AND CHEILOSIS IN THE 499 CHILDREN EXAMINED TWICE

—	Examined	Cheilosis	Rickets
Group A ..	Dec. 1939	1	20
	Feb. 1941	1 (same case)	6 (3 new cases)
Group B ..	Dec. 1939	2	8
	Feb. 1941	3 (all new cases)	Nil

The occurrence of cheilosis among these Oxfordshire children is of interest because this clinical sign of riboflavin deficiency has not hitherto been sought during school health inspection in England. Cheilosis—as evidenced by white sodden excoriation at the angles of the mouth—was noted in 17 of the 1568 rural children examined during this inquiry. It was present in 13 of those seen at the first examination and 4 of those seen at the second examination. Of 13 cases revisited 11 cleared up without treatment within a period of eight weeks; 2 cases of greater severity did not improve spontaneously, and at the end of eight weeks were treated with pure riboflavin. Both these children belonged to large families of low-grade agricultural labourers. The most severe case, in a girl aged 13, healed after treatment with riboflavin 30 mg. over a period of thirty days, but relapsed three months later, and required an additional 40 mg. of riboflavin over twenty-four days for cure. The second case, in a boy aged 6, was less severe and was cured by riboflavin 20 mg. over twenty-three days, and remained free of symptoms during four months' subsequent observation. He had been recognised as undernourished at routine school medical inspection, and was receiving 1 pint of free milk daily at school. The presence of riboflavin deficiency, in spite of such a daily milk consumption, may be explained by the low riboflavin content of milk at certain seasons.[2]

SUMMARY

The nutritional state of 499 rural Oxfordshire schoolchildren was determined in December, 1939, before the introduction of rationing, and again in April, 1941, after more than a year of dietary restrictions. There was no sign of increasing nutritional deficiency and no deterioration in the state of nutrition as assessed by the same observer. Some degree of deficiency of the vitamin-B_2 complex was present throughout the period of observation as indicated by the presence of 17 cases of angular stomatitis (cheilosis) among 1568 children between the ages of 6 and 14. Pure riboflavin was successfully used to treat 2 cases.

I am indebted to the education committee of Oxfordshire county council for access to the schools, and to Dr. H. C. Jennings, county medical officer of health, for the assistance of health visitors in home visiting. Pure riboflavin was provided by Messrs. Roche Products.

1. Wilson, D. C., Widdowson, E. M. and Wait, C. *Lancet*, 1937, 2, 1445.

2. Houston, J., Kon, S. K. and Thompson, S. Y. *J. Dairy Res.* 1940, 11, 145.

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MEDICINE AND THE LAW

Punishment for Bogus F.R.C.S.

UNQUALIFIED practitioners who are guilty of sheer fraud will attract little public sympathy. On June 23 James Leroy McCune, aged 40, described as a physician, of Alma Square, St. John's Wood, was arrested on the charge of wilfully and falsely pretending to be a physician. He was subsequently charged at Marylebone with wilfully and falsely pretending to be a Fellow of the Royal College of Surgeons on June 24, with a further similar charge relating to Aug. 29. A detective sergeant informed the magistrate that he found a car, with the word "Doctor" on the windscreen, outside the accused's address: on a door-post was the visiting card "James L. McCune, M.D., M.A., F.R.C.S." Told that he would be charged with pretending to be a physician, McCune replied "I am." Documents bearing the name "Dr. McCune" were inside the car. He had examined a boy on June 23 who was suffering from hay-fever and had told the boy's grandmother that he was suffering from congestion of the lungs and eye trouble, and that, if not taken care of, he might have T.B. The boy had neither of these diseases. Writing to the patient's grandmother, the accused signed himself "James McCune, F.R.C.S., physician and surgeon." He pleaded guilty. He had 20 previous convictions in Australia and two in this country; 17 were offences of dishonesty. McCune said he put the label on his windscreen to avoid being questioned about petrol rations. He had obtained no financial benefit by posing as a doctor. The police witness did not agree with this statement; there was a warrant against the accused at Edinburgh over the purchase of a practice. It was also said that, being a married man with two children, he had been posing as an unmarried man and associating with a 21-year-old unmarried woman from whom he had borrowed £20.

Mr. L. R. Dunne fined him £60 or two months' imprisonment, and refused to allow time for payment of the money. It was always a serious matter, said the magistrate, for an unqualified person to hold himself out to be a qualified medical practitioner; but it was much worse when the person was a man of bad character.

Child's Death in Hospital

We noted lately in this column an allegation of delay in treating a child admitted to a Manchester hospital for serious burns. The Manchester public health committee appointed a subcommittee to investigate the occurrence. The subcommittee's report, adopted by the full committee, disposes not inadequately of the complaints which had led the coroner to criticise those concerned.

The report establishes the following facts. The ambulance arrived at the hospital as the clock was striking 2.30 P.M. Three minutes later the assistant resident medical officer examined the child in the admission ward; it was then wrapped in warm blankets. He ordered an injection of morphia. At 2.40 he described in detail to the medical superintendent the areas affected by the burns. He put aside his other duties and went to the surgical ward. Morphia was injected at 2.45 and the child had been removed to the surgical ward by 3, at which time the assistant resident medical officer, putting aside his other duties, went to the ward and gave the intravenous injection of blood plasma; he remained with the child till after 5 P.M. No complaint of delay was received until a police officer attended the hospital to take statements. The report suggests that the absence of complaint gives conclusive value to the times entered in the drug book and case-record.

The subcommittee had previously considered the propriety of the treatment. Competent opinion was agreed that the child was suffering from severe burns and shock; that it would be bad practice to attempt to treat the burns until the child had been treated for shock; that the proper treatment was to apply warmth and to inject morphia; that, after the morphia, no further treatment must be given until there had been time (approximately 15 minutes) for the morphia to take effect, and that during this interval the child should not be moved. Competent opinion advised the committee that not only was this the proper treatment to apply in the first instance but that this was the treatment in fact given. After this preliminary treatment, and not before, it was desirable to give an intravenous injection of blood plasma. Here also the correct treatment was given. The report thus removes the adverse impression left by the inquest proceedings. If it was right that the matter should be ventilated before the coroner, it is fair that the result of the hospital inquiry should also receive publicity.

Counterclaims for Professional Negligence

Allegations of professional negligence are a not unfamiliar sequel or set-off to a claim for fees. The practitioners to whom the fees are owed have then to consider whether the trouble of suing the defendants is worth while. Allegations, however ill founded, must be rebutted; their "nuisance value" looms large to a practitioner who has other preoccupations more profitable and attractive than a day in court. A successful claim for fees, on the other hand, promotes the advantage of the profession as a whole. The labourer is worthy of his hire and there is no reason why he should submit to what he may regard as the process of being blackmailed out of it.

In McKeag *v.* Shah, a recent case in the Bath county court, the defendant was doubtless misguided rather than mischievously minded. The plaintiff, a dental surgeon, sued him for a fee of half a guinea for the extraction of a tooth. The defendant filed a long letter in answer and counterclaimed for £15 for alleged negligence. Having read the letter, the judge told the defendant that, on his own showing, there must be judgment for the plaintiff for 10*s.* 6*d.* with court fees; his allegations were serious; had he, asked the judge, any professional evidence in support of them? Mr. Shah had fortified himself with no such testimony. He gave his own story of the extraction; a fragment of the tooth, he said, had been left behind; there was continued bleeding and swelling afterwards, for which treatment was required. Mr. R. K. McKeag (who holds a medical as well as a dental qualification) gave evidence that it was a perfectly normal extraction; for reasons which he explained to the court there was more than ordinary bleeding in a certain percentage of cases. The defendant asserted that an X-ray photograph should have been taken before probing; Mr. McKeag replied that this was unnecessary. The judge found for the dentist on the claim and found against the defendant on the counterclaim for damages for negligence. The allegations, said the court, were entirely without foundation, ought never to have been brought, and, having been brought, ought not to have been persisted in. The dentist had given sound advice and excellent treatment and had been most wise in coming to court and facing the allegations. "So far from having his reputation impaired, he will, in my judgment, have established it on a higher footing." Here, at any rate, we may conclude, the trouble of suing for a fee was well worth while.

VAPORISED SULPHONAMIDE IN BRONCHIECTASIS.—Three Argentine physicians[1] are using a method of treatment for bronchiectasis and other forms of chronic pulmonary suppuration, which in their hands has proved highly successful in cases where ordinary medical measures have failed. Inhalations of a vaporised solution of Prontosil Soluble are given thrice daily. For each inhalation 3–5 c.cm. of the 5% solution is used, made up to 25 c.cm. with saline and vaporised in a special apparatus. Treatment must be continued for at least three months, and each patient receives on an average a total of 50 g. of prontosil soluble. The only toxic effect observed has been diarrhœa, which in a few cases has been persistent enough to preclude further use of the drug. In these cases Rivanol inhalations have been substituted, but this drug has an unpleasantly bitter taste. The method can easily be used for ambulatory patients.

1. Castex, M. R., Capdehourat, E. L. and Lavarello, A. *Arch. argent. Enferm. Apar. resp.* 1941, 9, 29.

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In England Now

A Running Commentary by Peripatetic Correspondents

I WAS talking the other day to the former chief of the gastro-enterological section of the Sanidad de Guerra—the Spanish Republican R.A.M.C. This brilliant surgeon has spent the last two years (with an interval when he was torpedoed while working in Atlantic convoy) reading the surgical literature of this country and has become an ardent admirer of the British School of proctology. After so long a wait it seems almost unbelievable that his skill and that of his other colleagues may soon be at our disposal. He told me about a staff routine which the Sanidad kept up even in the bitter final phases of the Republican's defeat. The case-records of every wounded soldier were centralised on the desk of a specialist and so my friend received the reports of every abdominal injury. These would comprise the front-line casualty card, the operation notes dictated to the anæsthetist during the course of the first surgical intervention near the line itself, the ward notes in that same advanced surgical post, the notes made in the hospital train and the record of the base and convalescent treatment. He would analyse these and send to each surgeon concerned a note of the end-result of his work together with comments given not in the form of military orders but as the advice of a senior colleague to a co-worker in a common task. He did not believe in rigid standardisation of treatment, for, as he said, putting a doctor in uniform may make him keep step and salute but cannot be used as a means of depriving him of his own professional initiative and judgment. Standardisation pushed to these lengths defeats its own end. It would be interesting to know whether R.A.M.C. methods do permit of such coördination of surgical work.

* * *

THE EGO AND THE ID

Said the Ego to the Id :
" Pray tell me all you did
In the days when your subconscious fast was locked ;
It would interest me vastly,
Be it ne'er so grim and ghastly,
And, let me add, I'm very rarely shocked.

For myself," continued Ego,
" I early learned to leggo
And see my fancy take me where it would,
But years of self-expression,
Have left me the impression
That I've always really hankered to be good."

Quoth Id : " When I was five,
I used to catch alive
And torture little insects by the hour,
At six I shot my sister,
I can't pretend I've missed her,
This complex Adler calls the lust for power.

I spent the next few years;
Despite my parents' tears,
Defying every code or book of rules,
My elders and my betters
Received indignant letters
Demanding my removal from five schools.

Throughout my teens I joyed
In libidos dear to Freud,
The twenties saw me rush from crank to crank,
I tried out thirty diets,
I headed fifteen riots,
I broke my father's heart and broke his bank.

I've dabbled since that time
In every sort of crime,
And sowed a goodly harvest of wild oats,
I've tried my hand at arson,
But since meeting with a parson,
I feel the time has come to burn my boats.

By dint of free confession,
I have banished all repression,
The cupboard's bare, the skeleton is out ;
No more can I pretend
When I cut my oldest friend
That I really do not know what I'm about.

For I've been analysed,
And motives once disguised,
Have now, alas, become an open book ;
Gone crime with all its glory,
Life's quite a different story,
The analyst has got me on a hook.

So if there's anyone
Who thinks it would be fun
To talk for hours to one who's paid to listen,
Consider first the price,
And take the *free* advice
Of a wistful, erstwhile out-and-out Narcissan.

Henceforth you must eschew
All excuses old or new,
And say farewell to irresponsibility,
Essay not to recapture
Crime's first fine careless rapture,
But concentrate on middle-aged utility.

Maintain a state of grace
By reflecting on the Race,
The future is to them and not to you,
Let their synthetic good
In mating or in food,
Become the theme of all you think or do.

And now the least, but last,
Forget about the past,
No longing, lingering looks at childhood's horrors,
So cut the Gordian Knot,
And remember Mrs. Lot,
Have done with all your Sodoms and Gomorrahs.

I hope I've said enough
To deter all but the tough,
This business is no joke, please rest assured,
But if with groans and tears,
You can stick it for three years,
You can count on being killed or being cured ! "

* * *

The compulsory evacuation of the London teaching hospitals has brought to the fore a problem which has worried some of us for a long time. Many members of the staffs of these hospitals have a comparatively slight knowledge of educational methods, and some of them refuse to believe that there is any connexion between the teaching of clinical subjects and university education. In the provinces the problem does not exist to anything like the same extent, for the medical schools there are so intimately linked with the university that they cannot help being imbued with its methods and traditions. But the London teaching hospitals have led a life of proud independence. Though latterly hard economic facts have made them face up to the fact that but for their grant from the University of London their very existence would be problematical, they still adopt the attitude that it is the university which should be proud of its association with their ancient seats of learning.

In the prewar days the organisation of the London teaching hospitals was of little practical importance and capable of a simple solution. The preclinical departments were run quite efficiently as more or less independent units with their own whole-time teachers, and the clinician took little interest in them. As often as not they were practically ignored and comings and goings between hospital and school were few and far between. Again, so far as the clinical side of the teaching was concerned, there was little to worry about. The material in the form of patients was there, the organisation in the form of the hospital authorities was there, and what little organisation seemed necessary from the point of view of the students was considered mere office routine, efficiently looked after by a dean who usually was an occupant of a chair in one of the preclinical departments. Many clinicians were quite cynical about it all—no clinician of repute had time for office work, that was a job for a whole-time professor. Under these circumstances teaching was little trouble to the clinician. He turned up for his rounds or outpatients—part of his statutory duties as a member of the honorary staff—and his clerks or dressers accompanied him, gleaning what facts they could from the great one as he visited or examined his patients. A call to the country of course took precedence, no matter how little warning it might be possible to give to the waiting students. Actually they did not suffer much for there were usually juniors available to take the

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place of their chief. With our happy faculty for evading unpleasant issues the question of conflicting loyalties as far as hospital and private practice was concerned never arose, for the latter came first.

The evacuation of the hospitals and medical schools has changed all this. No longer are patients, organisation or juniors supplied with unfailing regularity. No longer are there alternatives to which the students can go if a round is cancelled. Organisation has been necessary, planning has been indicated, awkward questions have had to be faced. What constitutes a medical curriculum? How can the absence of outpatients be compensated for by the use of inpatients? Are medical and surgical lectures essential? If so, how many should be given, what subjects should they cover and who should deliver them? How long should any one student spend in any one hospital? Can students be left for, say, a term in a hospital with ample clinical material but little in the way of teaching? The response of the average clinical teacher to this barrage can only be described as lamentable. There have been notable exceptions and the picture has perhaps been overpainted, but the essentials are true enough to life to be depressing. Alas that such august institutions should be so bankrupt of ideas. Not only the existence of our London medical schools is involved, but the whole future of the medical curriculum. If medical education is to keep pace with the progress of medical science and medical service to the community, reform must be drastic. A whole-time dean, as he exists in many American medical schools, will be needed, for the organisation of a medical school can no longer be left to the whims of consultants fastened into an unstable framework by a part-time dean in his spare moments. We must produce an adequate supply of whole-time deans from among the most able members of the profession—men with experience of clinical work and research and with a flair for administration who will be prepared to give their lives to the absorbing probems of medical education. As a corollary, the clinicians must realise that teaching is as important a part of their life as medical practice and that to conform to the requisite standards they will need to give a much larger part of their time, energies and abilities to the task than many of them do now.

* * *

A fantastic thing happens every month or so in my area which I suppose has its counterpart in every section of the kingdom. Eight or ten commercial competitors, none of whom have military interests, sit round a table to decide which among them or among other competitors not directly represented (at any rate in a voting capacity), should go into the Army. Their choice is guided by the imposition of a quota, an arbitrary number of Army "vacancies" to be filled. Consideration of the needs of the district does not seem to be within the competence of the meeting. The picture is made all the more bizarre when you realise that these men are not only commercial competitors but also professional colleagues; they are in fact medical practitioners.

Doctors by and large seem to take an individualistic view of their relations to society. This is illustrated by the fractional attendances at B.M.A. meetings, and it seems an odd anomaly of war-time planning that the health of the nation should be exposed to the voracious demands of the fighting Services transmitted through the very coarse filter of local medical war committees. So far as can be seen these committees, subject to an occasional appeal to the more balanced central body, are the real and deciding factor in shaping the civilian health services. It is hard to find any other principle in the adoption of this method of medical conscription except perhaps the old one of "set a thief to catch a thief" which was, after all, abandoned by the administration of Sir Robert Peel so far as it concerned the police about 100 years ago. I am not suggesting that the personnel of committees do not try to be honest, but the general practitioner member is qualified neither by experience nor his own interests to make a good job of it. There is no "consumer" advice to the committee, since neither local governments, public-health authorities or insurance committees have a vote.

The Shakespeare Committee was said to be on tour finding out just what the medical needs of the community are. If silence and inconspicuousness be a mark of efficiency its report should be good, though it does not need a committee to show that reception areas need more doctors, that public-health responsibilities increase with war, and that hospital treatment is no more efficacious to soldier patients if the doctor has got a Sam Brown belt.

* * *

A minor revolution gets scant notice these days and it is not surprising that the fall of a distinguished leader and the establishment of a new order have caused no stir in the medical world. The pituitary has always occupied an exalted anatomical position but in recent years its prestige in the endocrine system also has been steadily growing. America's leading brain surgeon honoured it by special study and summed up his views of its importance in the famous phrase "the leader of the endocrine orchestra." And then we came to learn how "the leader" exercised control by this and that tropic factor. The hormonal jigsaw puzzle was all but solved. But now Dr. Cramer (*Bull. N.Y. Acad. Med.* 1941, 17, 3) comes along to make us start all over again. The pituitary, he says, is not the leader. The endocrine orchestra has no leader. The members know the secret of working together and are a model for any League of Nations. Their bond is simple and is based on one point, not on eight or fourteen points. The One Point is the necessity of keeping the peace, or, if you prefer it in terms of physiology, of keeping the internal environment constant. They know, what the human race has still to learn, that by pulling together they survive; by pulling apart they perish.

SANITARY CONGRESS IN SCOTLAND

Sir Alexander Russell, M.D., whom the Department of Health for Scotland has charged with the organisation of their diphtheria immunisation campaign, at the annual meeting in Glasgow of the Royal Sanitary Association of Scotland said it was ironical that the first national effort to immunise British children against diphtheria should have been postponed until the time of a world-wide war. During 1940 there had been 15,711 notifications compared with an average of 10,000, and the total deaths numbered 676, the highest recorded for many years. During the first quarter of 1941 the epidemic continued but there had been a steep fall in the notifications from April to June. Recent weekly figures were still above average and there was reason to expect that the number of cases might shortly increase, perhaps reaching epidemic numbers during the winter. Analysis of the deaths showed clearly that pre-school children were far the most susceptible, and it was disturbing that of the total immunised 60% were school-children and only 33% pre-school. Immunisation against diphtheria should now take a permanent place in every health officer's annual programme. Sir Alexander Macgregor, M.O.H. for Glasgow, gave a warning that the wave of incidence of diphtheria was not over. He said that half the child population of Glasgow had been immunised but there was a serious need to protect the remainder of the children. Dr. G. V. T. McMichael, M.O.H. for Paisley, suggested that doctors should make it a routine practice to advocate immunisation in every home they visited. He could not see how 75–80% of the children could be immunised without another intensified national propaganda campaign.

Mr. William Cunningham, chief sanitary inspector for Clydebank, said that before the raids they had theorised about emergency measures; in practice they found many of their pre-war deductions were wrong. He was convinced that mutual help was the only way to meet the disorganisation which might be caused by attack. All local authorities would do well to arrange for their public-health departments in an emergency to be augmented from the staffs of other authorities.

Dr. Nora Wattie, senior child welfare M.O. for Glasgow, had been surprised that most children had come through the bombing with so little effect. But the small amount of clinical air-raid shock did not mean that no harmful influence was at work and the evacuation of children was still an urgent problem.

Dr. Frank Main, M.O.H. for Perth, thought that a drastic overhaul of school quarantine for infectious diseases was overdue. Thousands of school attendances were unnecessarily lost each year by the exclusion of contacts, while a child with a severe cold might, and usually did, remain at school to infect the whole class.

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Letters to the Editor

NURSING RECONSIDERED

SIR,—Over ten years ago THE LANCET rendered a great public service in setting up a Commission on Nursing. Very little progress has been made since that commission reported because neither nurses nor their employers have been willing to face the problems involved. The title of your leader "Nursing Reconsidered" gives us hope that THE LANCET is still interested in the nursing question.

Many of us have worked for years on projects for a more comprehensive training for the general trained state-registered nurse. We published our scheme in the *Nursing Mirror*, on which you were good enough to comment, because we had come to the conclusion that reorganisation of training would be useless unless carried out as part of a much wider plan to embrace the provision of suitable nursing care for everyone who wants it, including the old, the infirm, and the incurable—all those unfortunate people most inaccurately lumped together under the designation "chronic sick."

Looking at it from another angle we realised that there are thousands of women of all ages who could never be described as the "cream of our public school girls," many indeed who have left and are still leaving school at 14, who have a real liking for nursing and are prepared to do it, if conditions and salary scales are attractive. The majority of these women have neither the aptitude, education, nor ambition to become teachers and administrators, but many have the patience, kindliness, faculty of accurate observation and practical good sense which are the marks of a good nurse. We want to attract these people and give them a first-class training, and then register them and so provide the public with enough nurses.

You rightly wish to protect the title of nurse, but unfortunately it is already debased, for it is given indiscriminately by private individuals and public bodies to trained and untrained alike. We want to end this and to protect the public by registering every woman who makes a living at nursing and to debar from practice all the rest of the nursing miscellany. In our scheme we ask for two types of nurses, Grade 1 and Grade 2, both state-registered, both well trained and excellent in quality. Such a plan will not harm those state-registered nurses present and to come who can add other talents to the common store. There will be ample room in the nursing profession for teachers, leaders and specialists if the public is to get all the nursing and the health teaching it needs.

When the war started an Interdepartmental Committee on Nursing Services was sitting. It had issued an interim report and was accumulating facts, lacking which final judgment on the needs of the nursing profession cannot be made. This committee ceased working when the war started. THE LANCET would do no more than seek the fruition of its own work if it could stimulate a demand for the resuscitation of the Athlone Committee.

Richmond, Surrey. EVELYN C. PEARCE.
G. B. CARTER.

HOME GUARD PROBLEMS

SIR,—In your last issue both Mr. Abel and a Peripatetic correspondent mention what to me appears as the core of the Home Guard problem—viz., the isolation which military necessity will impose on treatment. As administrator of the 1st British Medical Unit to Spain I had in the first months of the Spanish war some experience of improvised hospital work in forward areas where fighting was evolving from guerrilla form towards positional warfare. This leads me to stress a point neglected (or rather, in my view, misrepresented) by Mr. Abel—that of *concealment*. He recommends that "A large notice with the letters H.G. and a red cross should be exhibited in a conspicuous position" so as to mark the casualty collection point. My difficulty (which would be shared by the casualties) is that this distinctive marking would be available to the enemy, who would have a local air superiority in order to be engaging the Home Guard at all. Facing the same opponents in Spain we had to discard all red cross markings, even brassards, as experience showed us that they invited priority of attack by aircraft, artillery and sharpshooters.

Apart from this criticism, which in no way affects the main argument, Mr. Abel's communication demonstrates very clearly that the period during which the Home Guard was considered to be unique amongst fighting units anticipating a casualty rôle of nil (or was it annihilation?) is now ended. As Mr. Abel points out, casualties may have to stay near their units, as evacuation may be a military impossibility. This isolation may well continue for days or even weeks. Their points of concentration then must be equipped to care for them until they can be passed further back, which means that some surgery *must* be done. The scope of this work will in effect be parallel to that of a rural practice 50 years ago. With the help of the district nurse staffing difficulties may be minimised; materials, under present conditions, obviously have to be "scrounged," or at any rate earmarked in advance of the emergency for transit to the point by M.O. (his own surgical kit), district nurse (her armamentarium) and voluntary housewife-nurses (scrounged ward kit).

On the question of nomenclature, it seems to me that the function of the Home Guard first-line casualty service indicates the title "casualty concentration point." "Casualty collecting point" is surely euphemistic if named with reference to any evacuating service and suggests that function is confined to assembly. Manifestly more than this is required.

K. W. C. SINCLAIR-LOUTIT.
M.O. for Civil Defence, Finsbury.

SANATORIUM STAFF

SIR,—Committees may come and committees may go, but a general appreciation of the present difficulties facing those engaged in the treatment of tuberculosis in this country is still long overdue. The tuberculosis system of this country is not merely a useful thing to have around, it is of vital importance to the nation; this is even more evident since the advent of war. At the present moment the sanatoria are not merely dealing with their usual quotas; one's clinical impression is that the number of discovered tuberculous cases is increasing, return cases are on the increase, and furthermore there is every indication that this increase will continue. The actual treatment is not a matter which can be learnt out of a book, nor will the possession of a D.P.H. give any clue to the problem; it is solely the prerogative of experience. Yet at this time invaluable key personnel, and I say key personnel advisedly, are being removed from the staff of various sanatoria on the excuse that they are wanted in the Forces. They are irreplaceable and surely their services are of more use to the nation in the proper place, which is the sanatoria. Their removal is short-sighted policy, and there can be no doubt what section of the community will eventually suffer—the general public.

Royal Chest Hospital, E.C.1. J. A. KENNEDY.

SOLDIERS AT CIVILIAN V.D. CLINICS

SIR,—Will you allow me to reply to the letters of Dr. White and Dr. Erskine in your issue of Sept. 20?

That a man should have been diagnosed gonorrhœa by a civilian specialist and urethritis subsequently by a military specialist has done no harm, so far as I can see, except to the civilian specialist's amour propre. If there is any known method of ensuring that some thousands of medical officers and some tens of thousands of soldiers all obey regulations—and there are regulations about filling up the pro formas—I should be glad to be informed of it. The pro forma was made to fold once and be kept in the paybook; if it is filled up correctly it contains all the information necessary. There is no guarantee that a V. 44, if adopted, would always be filled up correctly and always be sent with the patient when he attended a civil clinic. A soldier's proficiency pay is restored from the date when his C.O., acting on the recommendation of a V.D. specialist, considers he has regained his physical efficiency. The date of his final test of cure therefore should have no effect on the loss of proficiency pay.

Perhaps I did not make myself clear as regards "theorising." What I tried to convey was that it is impracticable, even forbidden, to tell civilian medical officers where a soldier (and his unit) is stationed, where he is going and when. This would entail a great deal of extra work and Hitler might be listening!

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It is not suggested that the present scheme is perfect but it was evolved only after much thought and discussion. If Army form I 1247 were sent backwards and forwards each time a man attended a civil clinic the chances of it surviving to reach the War Office, where it is reviewed, would be small. If Dr. Erskine will refer to my letter he will see I did not say there *are* a multiplicity of forms. It must be remembered that the commercial traveller, the actor and the merchant seaman go to a clinic only when they wish. Do they always attend regularly and do they never default? The soldier is *sent*, often unwillingly. It is admitted that in some cases there are gaps in treatment; this is bound to occur in those cases where there are adequate military reasons why a man cannot attend. A soldier suffering from V.D. has direct access to his M.O.; he merely informs a N.C.O. that he wishes to "report sick."

If M.O.'s in charge of civilian V.D. clinics will communicate with me direct in future, or with the Army specialist who treated the case in the first instance, we shall be only too pleased to coöperate to the best of our ability, and I feel sure this method will secure better results than ventilating the matter in the press and casting aspersions on Army methods.

T. E. OSMOND,
War Office. Adviser in Venereal Disease.

FATAL STINGS

SIR,—In his interesting and important account of cases of sudden death following wasp-stings Dr. Dyke discusses the possible explanations of such tragedies. The one he favours is, I think, alone tenable—that the insect happens to puncture a vein in the dermis so that some of its venom enters the circulation directly instead of being "fixed" and destroyed by the skin. I remember many years ago discussing this question with Sir Patrick Laidlaw, to whom I never took a problem without receiving enlightenment or being shown a new angle from which to tackle it. He agreed with me that the above explanation was the only one that covered the facts. These rare cases afford another illustration of the importance of defensive reactions in the skin in protecting the organism from major disasters. Brocq in his "Cliniques Dermatologiques" describes some cases in which this function of the skin is strikingly apparent. Dr. Dyke refers to the experiments of Arthus in which rapid death in dogs was caused by injecting bee-venom intravenously. Injection of the venom intradermally, of course, merely provokes a local reaction in the skin. Another example of the disaster that may follow direct penetration of the skin-barrier is afforded by the rapid development of acute streptococcal septicæmia in surgeons or in those doing autopsies after puncture-wounds as opposed to scratches.

London, W.1. H. W. BARBER.

HAMMER TOE

SIR,—In times like these there is great need of a safe and simple cure for hammer toe which will permit the patient to return to duty with the minimal delay. I suggest that such a cure can be obtained from removal of the proximal phalanx. Wounding of the tendons must be avoided. The expanded extensor tendon soon retracts and the end-result is a slightly shortened toe which retains some movement. Inflammation in the bursa over the bony prominence of the hammer toe subsides after a few days, and the corn which is always present can quickly be removed by using collodion salicylicum (20%) as a corn paint. No other method seems to me to need so short a time off duty and none gives so good a permanent result.

Bradford. NORBERT SCHICK.

JOHANN PETER FRANK

SIR,—The significance of Frank's pioneer work in the development of medical clinics and of public health in general has hardly been overlooked in Germany as completely as you suggest (*Lancet*, Sept. 6, p. 296). Laudatory references to him are to be found in standard handbooks of medical history—e.g., Puschmann's—and in historical introductions to hygiene manuals, apart from the scholarly monographs of Rohlfs (1880), Doll (1910), and K. E. F. Schmitz (*Veröff. MedVerw.* 1917, 6, 496). Frank was, moreover, honoured by medical historians of other nationalities. Thus Garrison writes: "His great work on public hygiene, as covering the whole of man's life from the womb to the tomb—sewerage, water-supply, even school hygiene, sexual hygiene, taxation of bachelors and suitable benches and meals for the children, as well as the ideal of a scientific 'medical police,' really left little for Pettenkofer and the moderns. In the preventive medicine of the future, the name of Frank will loom larger with meanings, for he was himself a true modern." And quite recently Sigerist has published (*Bull. Hist. Med.* Jan. 1941) an oration by Frank, entitled The People's Misery: Mother of Diseases, of which he says: "One hundred and fifty years have passed since Frank delivered his address. A great deal has changed since then, and yet his words still sound incredibly modern."

S. H. DAUKES.
Wellcome Historical Medical Museum, N.W.1.

IMPETIGO CONTAGIOSA AND NEPHRITIS

SIR,—Dr. Hope Simpson (*Lancet*, Sept. 13, p. 328) raises a point about nephritis following impetigo contagiosa which deserves comment. Nephritis as a specific complication of impetigo must, he says, be very rare, whereas albuminuria and anasarca due to sensitivity to ammoniated mercury ointment is not uncommon. Nephritis may at present be a rare complication of impetigo just as it is now a rare sequela of scarlet fever but there are numerous records of "impetigo-nephritis" in the literature (see the recent reviews of Silvers, S. H. *N.Y. St. J. Med.* 1939, **39**, 1093; Futcher, P. H. *Arch. intern. Med.* 1940, **65**, 1192). For example, R. Southby and B. L. Stanton (*Med. J. Aust.* 1926, **1**, 127), in an inquiry about antecedent infection in 103 children with acute nephritis, found that 17 had had impetigo two to six weeks prior to admission to hospital. On the other hand, sensitivity or idiosyncrasy to ammoniated mercury is, according to P. Harper (*J. Pediat.* 1934, **5**, 794), uncommon, and mercurial nephritis following its inunction must, if it occurs at all, be extremely rare, for this mercury compound, being very insoluble, is poorly absorbed.

London, N.W.3. ROBERT CRUICKSHANK.

TRAUMATIC ASPHYXIA

SIR,—Mr. Grant Bonnin writing of traumatic asphyxia (Sept. 20, p. 333) states that no case has been reported showing petechiæ only. I cannot believe that such cases are rare and suggest that they have not been reported as they are thought to be of little interest. I have seen one air-raid casualty with petechiæ of the distribution characteristic of traumatic asphyxia. This is the only case of which I have notes but I have seen the phenomenon in civil injuries. The patient was a boy of 14, who was buried by debris in a shelter as a result of a bomb explosion. I saw him 7 hours after injury. He did not appear to be shocked or seriously hurt; he had petechial hæmorrhages of the eyelids, brow, neck and upper part of chest. None were found in the retinæ. X-ray of his chest showed no abnormality, although for 2 days there were signs suggesting consolidation at the right base. He did not spit blood. His petechiæ faded rapidly and were gone in a week. The exact nature of the injury was not determined. The boy had not lost consciousness and said that he was rescued quickly.

Leavesden Hospital. ROBIN PILCHER.

SIR,—The article by Mr. Grant Bonnin recalls an interesting case of traumatic asphyxia which I saw 5 weeks ago. A young woman had an epileptic attack and came under my care the same day. She had subconjunctival hæmorrhages, "total" on the right side, but incomplete on the left. Her face and neck were a vivid cyanotic hue. She was wearing collar and tie at the time of the attack, and the discoloration stopped abruptly at the level of a constriction mark caused by the collar. There was no discoloration below this level. I was able to observe her for 3 days, during which time the high colour definitely faded, and also became rather more red than blue. It is suggested that the epileptic spasm caused venous congestion with swelling of the neck, and that the tight collar then caused further congestion sufficient to produce the appearance described above the constricting band.

Lowestoft. E. E. T. TAYLOR.

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SPLENECTOMY IN ICTERUS GRAVIS

SIR,—The paper by Hardwick and Lloyd in your issue of Sept. 20 will have been read with interest by pædiatricians. Recovery in this case does not justify the assumption that splenectomy is of any value in the treatment of this disease. The operation was practised for a short time in the United States, but this treatment is now regarded as irrational. It is generally accepted that the splenomegaly is a reaction to the disease rather than the cause. In the last few years I have observed about fifty cases of erythroblastosis of which icterus gravis is the commonest clinical type. Many were closely studied from the time of birth in a maternity hospital. Spontaneous recovery often occurs and the recognised sequelæ are exceptional. I have recorded several cases (*Trans. Edinb. obstetr. Soc.* 1939, p. 63), and have since seen a number of others, in which a very active reticulocytosis and rapid rise of hæmoglobin occurred without any treatment. So long as the ætiology remains obscure, blood transfusion is likely to remain the therapeutic mainstay. The object of blood transfusion is to maintain the hæmoglobin at a safe level until the rate of regeneration outstrips that of hæmolysis. Definite blood coagulability with hæmorrhagic signs often occurs in severe cases of the disease and can be efficiently treated by the administration of vitamin K.

J. L. HENDERSON.

Dept. of Child Life and Health, Edinburgh.

WAR-TIME BEHAVIOUR

SIR,—The Mental Health Emergency Committee has been making an inquiry into the behaviour of children and adults under war conditions. Questionnaires have been sent out to child guidance clinics, mental treatment clinics, psychiatric wards of emergency hospitals, and to psychiatric social workers in reception areas. This inquiry was intended to be only a preliminary survey and before proceeding further the committee would be much interested to learn whether any similar investigations are being carried out, either by groups or by individuals, and if so would welcome opportunities of coöperation.

Mental Health Emergency Committee, 24, Buckingham Palace Road, S.W.1. EVELYN FOX, Hon. Secretary.

Public Health

From the School Reports

HOLLAND (LINCS)

Dr. W. G. Booth throws some light on the cost of the school medical service in a small county. The number of school-children on the roll at the end of 1940 was 10,180, and the net cost of their medical service was £5202, or 10*s.* a head per annum. The Board of Education grants supplied £3282, the remainder came from the rates and absorbed 2*d.* out of the general elementary-education rate of 4*s.*

The use of paper towels was continued in some schools, and it was hoped to extend this system throughout the county, but that is of course impossible at present. In view of the increasing prevalence of scabies this is unfortunate, for the communal school towel is open to suspicion of spreading the acarus. Mr. C. A. Johnston, senior school dentist, calls attention to the very bad state of the mouths of school entrants. Caries of the temporary teeth seems to be increasing in spite of the undoubted improvement in the general nutrition of children and of expectant mothers.

KETTERING

The average number of children on the school registers in 1940 was 4119 and the number of received children who remained in the borough at the end of the year was 2863. The ebb and flow of the evacuated population, most of which came from London, is interesting. There was a steady reduction from 2533 in January to 1434 in August, the number doubled in September, and in October reached 4397. It has not been fully realised how great is the strain of this fluctuation on billeting and education in reception areas. During the year 112 children were admitted to hostels because they were unfit for billeting. Of these 26 were taken home by their parents and 65 were returned to billets because they were cured. Dr. Cecil Hogg, in his school report, gives some information on unsatisfactory evacuees which will be useful in the future, for evacuation has given us the only chance we have ever had to find out the number of objectionable children, what percentage of them can be cured and how long it will take to cure them.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 20

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1140; whooping-cough, 2289; diphtheria, 957; paratyphoid, 125; typhoid, 27; measles (excluding rubella), 612; pneumonia (primary or influenzal), 434; puerperal pyrexia, 134; cerebrospinal fever, 121; poliomyelitis, 28; polio-encephalitis, 3; encephalitis lethargica, 6; dysentery, 102; ophthalmia neonatorum, 76. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 17 was 1266; including scarlet fever, 129; diphtheria, 252; measles, 28; whooping-cough, 571; enteritis, 22; chicken-pox, 24; erysipelas, 20; mumps, 6; poliomyelitis, 2; dysentery, 14; cerebrospinal fever, 21; puerperal sepsis, 12; enteric fevers, 45; german measles, 3; malaria, 1; polio-encephalitis, 2; other diseases (non-infectious), 44; not yet diagnosed, 75.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 14 (1) from whooping-cough, 23 (1) from diphtheria, 38 (1) from diarrhœa and enteritis under 2 years, and 8 (0) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 9 deaths from diarrhœa. There were 3 fatal cases of diphtheria at Liverpool.

The number of stillbirths notified during the week was 170 (corresponding to a rate of 32 per thousand total births), including 14 in London.

Obituary

ROBERT THIN

M.B., LL.D. EDIN., F.R.C.P.E.

Dr. Thin who died at Stow on Sept. 18 in his 81st year had spent the greater part of his professional life in general practice in Edinburgh where his energy and kindly disposition earned him the esteem and admiration of colleagues and patients. For fifty years he was associated with the Royal College of Physicians, becoming president 1931–33 when the LL.D. Edin. was conferred on him. After qualifying in 1887 and working in the Royal Infirmary and Maternity Hospital he went to Vienna and Prague studying diseases of the ear, nose and throat and the use of obstetrical forceps. Then as assistant to Dr. George Hunter of Linlithgow he lived in South Queensferry where he was assistant surgeon to the Forth Bridge works during the period of erection. Later his practice became very large and he did not find much time for writing, but he recorded in the *Edinburgh Medical Journal* a study of five generations of familial cysteinuria. He was a lively member of the Old Edinburgh Club and his antiquarian interest found expression in "The Old Infirmary and Earlier Hospitals" and "Medical Quacks of the Eighteenth Century," while at the request of his college he wrote biographical sketches for the portraits hung on the college walls. He carried his own years lightly and continued in practice until a few weeks of his death.

WILLIAM NEIL CAMPBELL

M.D. EDIN., M.R.C.P.E.

THE death of Dr. Neil Campbell is announced from Africa where he was serving with the South African Forces. Dr. Campbell graduated in Edinburgh in 1927, taking the M.D. in 1939. After a house appointment at the Royal Infirmary he went out to Natal and set up in practice at Durban where his ability was recognised by his election to the staff of the King Edward Hospital, Durban. During his student days he was a keen angler and athlete with a good record at rugby and field athletics. He leaves a widow and two young children.

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WORLD ORDER AT THE BRITISH ASSOCIATION

A CONFERENCE on Science and World Order was held in London (Sept. 26–28) by this newly formed division of the British Association for the Advancement of Science. The six sessions considered, in order, the relations of science to government, human needs, world planning, technological advance, post-war relief and the world mind, under the respective guidance as chairman of Sir Richard Gregory (president), the American Ambassador, the Soviet Ambassador, the President of Czechoslovakia, the Chinese Ambassador and Mr. H. G. Wells. Much attention has been given in the press to the conference and to the Declaration of Scientific Principles with which it ended and it will suffice to mention the salient points discussed and those aspects particularly relating to medicine.

Scientific contributions were conspicuous by their absence and this was inevitable in a meeting designed to bring together men of affairs and men of science and to impress on the former the contribution which the latter can make to problems of government. The conference brought to fruition a conviction held by Sir Richard Gregory, as one speaker said, "for some 70 or 80 years" and from that point of view was eminently successful. Summing up the views expressed at the meeting Dr. JULIAN HUXLEY emphasised the agreement on the practical importance of science as a means of implementing human progress. Science had an overwhelmingly important part to play in post-war reconstruction; but it must be free and it must be international, and not merely on a national basis. Though it was not much good planning if we did not win the war, it was not much good winning the war if we did not plan, and plan now. An international reconstruction committee should bring together governments and scientists. Standards are now scientific and optimal, for example in nutrition, and the distinction between need and want was now clearly realised. Planned development was best but it must be preceded by surveys. Science must be preventive and the education of both children and adults in science needed reconsideration. The pooling of knowledge and the narrowing of the gap between the birth of an idea and its execution was going on but going on too slowly.

Undoubtedly the contribution by Sir JOHN ORR deserves first mention. Whilst he said nothing which was not well understood by every doctor and social worker, he said it so clearly and persuasively that a deep impression was made. Human needs in nutrition are now known, three authoritative investigations—by the British Medical Association, by the League of Nations, and in the United States—having all reached approximately the same conclusions. Forty to fifty per cent. of the population in the United Kingdom and the United States did not enjoy such optimal nutrition. The connexion between health and diet was well proved and numerous field experiments had shown the benefit to the health of mothers, infants, school-children and recruits, of adequate diets. The enormous improvement in the public health of this country since 1914 was correlated with a fifty per-cent. increase in the consumption of protective foods. Yet the lamentable folly of restriction and even the destruction of foodstuffs had been widely indulged in. The war had forced upon us a policy of feeding according to need and not according to profit. A world food policy could and should be worked out now and he thought the food interests would coöperate if they were asked. Many other speakers however felt that a scientifically planned economy was impossible on a capitalist basis.

On the use of scientists by the Government in the war effort divergent views were expressed. Lord SAMUEL described the scientific advisory committees which had been set up by the Government, but Prof. J. B. S. HALDANE said that though he had done work for the three Service departments he had not made contact with any of these committees and his colleagues "though perhaps better scientists were probably less pushful than himself." His remarks on the tragic failure of the Government to use scientific workers to the full were endorsed by Dr. J. E. D. SWANN. Among contributions to post-war planning, Lord HAILEY described the vital need for it in the future development of our African colonies. As regards health the general public might not be able to distinguish between the advantages of direct and indirect rule but at least they could appreciate that a district as large as Yorkshire was served by one doctor and two dispensaries, and that huge districts had no domestic animals whatever because of sleeping sickness. There was need for far more international conferences for combined planning in Africa. Sir JOHN RUSSELL made several practical suggestions for conserving now essential breeding stocks of cattle, grain and fruit trees necessary for the reconstruction of Russia's "scorched earth," and Mme. PRIESTMAN-BREAL warned us most charmingly against psychological traps, such as the assumption of superiority, in distributing post-war relief. Mr. RICHARD ALLEN of the American Red Cross described the urgent need to build up reserves of medical equipment to replace those taken by the Germans from the occupied countries. Dr. HUGH SMITH of the Rockefeller Institute also emphasised the need for a concrete plan to be worked out now to prevent the post-war spread of epidemics; this should include plans for an international health organisation. He quoted Surgeon-General Parran's remark "that there must be no property qualification for health." Other speakers urged that we must take the risk of being generous after the war and Mr. PHILIP NOEL BAKER hoped that what would necessarily be the greatest act of charity the world has ever known would lead to permanent and not transient results as after the last war. A world food policy would be of incalculable value as a stabilising factor in economics. The general impression left on an observer was that if the politicians and the public would allow scientists to "do their stuff," there might be much hope for the post-war world.

The conference approved the plan of the council for setting up immediately small committees to work out in detail the main suggestions put forward at the meeting.

Panel Practice

COSTLY OR EXPERIMENTAL TREATMENT

X, on Dr. A.'s list, was attended by his assistant, Dr. B. In September, 1940, Dr. B. sent X to a consultant who diagnosed myasthenia gravis and suggested Prostigmin and Fertilol (wheat germ oil) capsules. Thereupon Dr. B. wrote a private prescription and instructed X to purchase prostigmin, for injection and oral administration, telling X that he was not able to issue insurance prescriptions as the drugs in question were not included in the National Health Insurance prescribing list. Dr. B. himself visited a local chemist with reference to the supply of prostigmin, a drug which he said was previously unknown to the manager, and left with him a leaflet issued by the manufacturers. In October Dr. B. wrote to the chemist, asking him to order a concentrated solution for injections and to obtain a supply of the tablets. For these X paid £20 4*s*. 6*d*. between October, 1940, and April, 1941. In April X purchased, again on the instructions of Dr. B, 400 capsules of another preparation costing £3 8*s*. bringing up his total expenditure before communicating with the local insurance committee to £23 12*s*. 6*d*. Dr. A., questioned by the committee, said that neither the prostigmin nor the vitamin E could properly have been ordered at the cost of the chemists' account for the reason that the treatment was experimental. The medical service subcommittee took the view that the drugs were requisite to a method of treatment recommended by the consultant, which method of treatment was in fact adopted (as it need not have been) by Dr. B. Where, the committee ruled, an insurance practitioner decides (presumably after due consideration of all the circumstances, medical and otherwise) to prescribe a particular drug he would not be justified in ordering that drug except at the expense of medical benefit funds. The insurance committee decided to recover from Dr. A. the amount of £23 12*s*. 6*d*. with which to reimburse the insured person, but they have applied for the Minister's approval to pay Dr. A. from the practitioners' drugs account the sum of £18 5*s*., being the cost at tariff rates plus dispensing fees of the drugs which were administered.

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In this case the issue was not primarily one of expense. It must by now be common knowledge that an insured person is entitled, under the provisions of the N.H.I. Acts, free of cost, to such proper and sufficient drugs as are requisite for his treatment. The doctor providing this treatment must, in the first instance, be the judge what drugs are proper and sufficient, and his discretion is limited only by the fact that he may be asked to satisfy the panel committee that he has not prescribed medicines in excess of what is reasonably necessary for adequate treatment. No particular drug, therefore, can be prohibited on the ground of its cost. The question is not whether the drug ordered was costly, but whether it was unnecessarily costly, that is, whether a preparation of equal therapeutic value could have been ordered at less cost. This criterion applies to proprietary medicines as well as to officinal medicines and it is extremely unlikely that a practitioner acting on advice from a consultant would run any risk of surcharge merely because the prepafation advised was costly. Obviously too a practitioner having obtained advice from a consultant cannot say "This treatment is too expensive for a panel patient, but I am prepared to administer it if the patient pays for the medicament." Instances have often been given of expensive preparations which have been prescribed quite properly for insured patients. An antipneumococcal serum cost £20; an insured person took for several years (sometimes 4 or 5 times a month) a preparation of suprarenal cortex, costing some £2 7s. a time. No question was raised as to the propriety of this prescribing. Many preparations of ovarian hormones are now prescribed for insured patients and these, as practitioners are well aware, are costly.

Appointments

BRADSHAW, D. B., M.B. Dubl., D.P.H.: deputy M.O.H. for South Shields.

GREGORY, J. L., M.B. Glasg., F.R.F.P.S., D.P.H., D.T.M. & H.: M.O.H. for south-west Salop united districts.

MARSHALL, D. V., M.B. Glasg., F.R.C.S.E., F.R.F.P.S.: medical superintendent at the new municipal hospital at York.

WISE, C. S., M.B. Lond.: examining factory surgeon for Sandwich, Kent.

Births, Marriages and Deaths

BIRTHS

KING.—On Sept. 21, at Sutton, the wife of Major Cecil King, R.A.M.C.—a son.

LLOYD-HART.—On Sept. 23, in London, the wife of Dr. V. E. Lloyd-Hart—a daughter.

LUNT.—On Sept. 22, at Witney, the wife of Captain H. R. W. Lunt, R.A.M.C.—a son.

PEYTON.—On Sept. 22, at Ilfracombe, the wife of Captain H. N. Peyton, R.A.M.C.—a daughter.

SANDERSON.—On Sept. 21, at Horncastle, Lincs, the wife of Dr. G. H. Sanderson—a son.

WALLACE.—On Sept. 22, at Clifton Hampden, Abingdon, Berks, the wife of Dr. W. Herschel Scott Wallace—a son.

MARRIAGES

BLOWERS—HOCKEY.—On Sept. 18, at Weymouth, Robert Blowers M.R.C.S., lieutenant, R.A.M.C., to Eva Gethin Hockey.

BURGESS—WHARRIE.—On Sept. 20, at Chislehurst, David Burgess, M.R.C.S., of Hemel Hempstead, to Patricia Wharrie, of Chislehurst.

COLLIN DAVIES—ROBERTS.—On Sept. 24, at Bryn-y-Maen, Colwyn Bay, Hugh Collin Davies, M.D., of Ruthin, to Anne Roberts.

McDONNELL—FOLEY.—On Sept. 24, in Dublin, Colm Angus McDonnell, M.D., to Margaret Mary Foley.

MARSHALL—CRYMBLE.—On Sept. 23, at Belfast, Robert William Stanley Marshall, M.B., R.A.F.V.R., to Hilary Crymble, M.B.

PITT—CECIL.—On Sept. 27, at Sway, Hants, George Heriot Pitt, F.R.C.S., to Margaret Mary Cecil.

WYNNE WILLSON—HAMERSLEY.—On Sept. 20, at Milford-on-Sea, William Wynne Willson, B.M., captain, R.A.M.C., to Pamela Hamersley.

DEATHS

BETTS.—On Sept. 22, Leonard Bowring Betts, M.R.C.S., of Cleverdon House, Bradworthy.

HICKS.—On Sept. 26, at Frinton, Essex, Thomas William Hicks, M.B.E., M.D. Lond., J.P.

JOHN.—On Sept. 28, at Ogbourne, Wilts, David William John, M.C., B.A. Camb., M.R.C.S., late major, R.A.M.C., of Bridgend, Glam, aged 52.

Notes, Comments and Abstracts

PEP LOOKS AT EMS

THE Emergency Medical Service, as its name suggests, was created as a temporary makeshift, but like many of our improvisations it may casually develop into a permanent part of our social structure, and this possibility adds importance to PEP's new broadsheet [1] on hospitals in war-time. This clear and objective review reminds us of the present scope of the E.M.S. With 225,000 beds, 1700 full-time doctors and another 5150 on call, it is costing the Government—and us—nearly £16 million a year. The E.M.S. has pooled our medical personnel and equipment, has given us planned distribution of medical care and provided special services throughout the country. In many remote districts general practitioners have been stimulated by contact with metropolitan colleagues, and a mass of otherwise scattered clinical material has been made available to the research worker. The upgrading of many smaller hospitals and the new hutted buildings are a lasting and valuable addition to our hospital services. Municipal and voluntary hospital staffs have come to know and appreciate each other, and the implications of medical coöperation have been made manifest. So much for the credit side. Against these achievements PEP sets an administration which is clumsy and often unworthy of its personnel. Its system of accounts is unbearably complex, and it suffers from a diarrhœa of memoranda. The Ministry of Health has delegated wide powers to its regional officers, but in practice, PEP thinks, does not encourage their use. The selection of key officers has not always been wise. The hospital officers, drawn from the Ministry of Health permanent staff, have not always had the necessary initiative and administrative experience. The London sectors, often illogically distorted to fit round the big voluntary hospitals, have tended to work as over-independent units. PEP pleads for administrative capacity rather than medical eminence as a criterion for selection of group officers.

If the E.M.S. is to become a national service PEP would like to see the present curious anomalies of who is and who is not eligible for treatment swept away. Beds would instead be open to all, and there might well be a national hospital contributory fund incorporating all existing voluntary funds. Outpatient departments and specialist clinics, to which the general practitioner could refer his patients, should be opened in crowded reception areas, and here doctors from the E.M.S. and armed forces who were not fully occupied, might serve. Pædiatric services at base hospitals—similar to those provided in the London sectors—should be set up elsewhere, and tuberculous patients be given priority for admission to hospitals. The courses for E.M.S. doctors at special clinics might be extended. PEP thinks that our shortage of doctors is mostly due to maldistribution and suggests that the Central Medical War Committee should become a War Medical Service Committee, working through regional committees who would have the right to move private practitioners to areas where they were most needed.

The broadsheet welcomes the spate of interest which doctors and nurses are showing today in what they feel to be the inevitable reorganisation of their professions. So far regionalisation is the only generally accepted principle, and PEP, while acknowledging the fine work the Nuffield Hospitals Trust has done in this direction, would like to see more stress laid on unification rather than on the mere coördination of existing systems. The broadsheet points out the danger of regionalising a part of the medical services without regard to the health services as a whole, and reiterates the view, set out in the PEP report on British Health Services, that it is the consuming public which will pass final judgment on all these plans.

1. Planning No. 177. Obtainable from PEP, 16, Queen Anne's Gate, London, S.W.1.

FOURTH ADDENDUM TO THE B.P. 1932.—The latest addendum, reviewed in THE LANCET of Sept. 6 (p. 290), is now obtainable, and became official on Oct. 1.

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ABORTION RATES IN STOCKHOLM

FIGURES relating to illegally induced abortion are not easily come by in this country. An analysis of 800 cases treated at the Sabbatsberg Hospital, Stockholm, from 1935 to 1937 throws light on the fundamental causes of the practice. The investigation, reported by Dr. G. Inghe and Dr. G. A. Jonsson,[1] showed abortion to be much commoner among unmarried than married women, as might be expected. Among unmarried women the rate reaches a maximum between the ages of 25 and 30; in married women it rises with age. Figures collected from public hospitals showed that pregnancy in unmarried women resulted in birth of the child at term and eventual marriage of the parents in a third of the cases, illegitimate births in a third and abortion in a third. Many cases of illegal abortion, however, do not reach hospital, and the practice is estimated to be more common than pregnancy going to term among unmarried women. About a third of the 800 cases admitted to having attempted to procure abortion, usually medicinally. Most of the mothers were working women earning comparatively small wages—waitresses, kitchen hands, hairdressers and shop assistants. Of the married women, those with several children and coming from overcrowded houses were more numerous than those with one or two. Most of them had used contraceptives, but seldom selected the most reliable or used them regularly. Many of those who knew of reliable contraceptives had not used them because of distaste, or because they grudged the inconvenience. About half the 800 women were married, or living as married, and most of the rest had regular sexual intercourse; intercourse was occasional in only 7%. Most of the unmarried women had sought abortion on economic grounds. Poverty and unemployment had delayed marriage for some, and others doubted whether they would be able to support their children. Nearly half feared the social criticism which birth of an illegitimate child would provoke, and two-thirds dreaded the anger of their parents. Only a third of the whole series had any idea that induction of abortion was attended with risk. Among the married women, 75% gave economic reasons for their action, 10% considered themselves to be too much exhausted to have more children and 40% wished to space their children; 20% feared the inheritance of some abnormality by the child, or were influenced by memories of an unhappy childhood. Dr. Gårdlund, in his experience of practice in Stockholm, found that requests for abortion increased year by year. Some years ago he received 170–190 requests of the kind yearly, but in 1937 the figure rose to 266, in 1939 to 278, and in 1940 to 410. Among these the cases in which he could legally undertake abortion amounted to 7 or 8 a year.

"WHO WALK ALONE"

Dr. Perry Burgess, president of the American Leprosy Foundation, has taken the history of a young American soldier who developed leprosy after service in the Spanish-American war in the Philippines, and told it in autobiographical form (London: J. M. Dent and Sons. Pp. 318. 12*s.* 6*d.*). His reconstruction of the emotional experience of this unfortunate young man from the facts given him during many intimate years have such verisimilitude that it is difficult to credit they were not indeed his own. It shows, moreover, that the author possesses that inward sight which is the mark of the true artist, and while the tale is told in factual style the psychological element is never forgotten. Nine years after the young man's return from the Philippines to America he developed leprosy, and a year afterwards was sent out to the Leper Colony on the Island of Culion in the Philippines. There he started another stage of his painful spiritual pilgrimage. Slowly he determined to make the best of a world that had suddenly shrunk to the cramping confines of a leprosarium. He made his house and garden the most beautiful in the colony and gradually became interested more and more in his fellow sufferers. He organised work schemes, and received the hearty coöperation of both authorities and patients. All the time he grew in spiritual stature, and his record should be put amongst the many others of those who have achieved nobility through suffering. Despite the horror which leprosy, above all other diseases, seems to inspire, this book is not gloomy but vital and lively. The story reveals the mind of the incurable with an uncommon vividness, and though it is a story it is authentic.

1. *Nord. Med.* March 8, 1941, p. 725.

INDEX OF FOOD INVESTIGATION.—The fascicle dated March 1941 (vol. 12, no. 4) contains 545 items, varying from brief abstract to a mere mention of articles on every aspect of food investigation which have appeared in Empire and American journals. The foreign references are few and old. Food investigation has been quickened by war conditions (this issue alone reveals 650 workers) and an index to the literature is essential to codify results and prevent overlapping. From H.M. Stationery Office. 4*s.* 6*d.*

Medical News

University of Sheffield

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B., CH.B.

Parts II and III.—Hazem Barrada, Pauline M. Hardcastle, Labib Ishak, L. F. Q. Maclaine, and Margaret E. Withers.

Medical Honours

The following honours have lately been awarded:—

O.B.E.—Acting Wing-Commander J. P. Huins, M.R.C.S., and Acting Squadron-Leader B. C. Curwood, M.B. Birm.

D.S.C.—Temp. Surgeon Lieutenant A. G. Reid, M.B. Aberd., R.N.V.R., H.M.S. *Mashona.*

Medical Prisoners of War

The following R.A.M.C. officers have been posted as prisoners of war: Captain A. G. V. Aldridge, M.B. Camb.; Temp. Major Robert Harvey, F.R.C.S.E.; Temp. Major P. D. C. Kinmont, M.B. Lond.; and Temp. Major G. A. W. Neill, M.D. Belf.

War-time Nurseries

On Oct. 29 the Nursery School Association of Great Britain will meet in consultation with the National Society of Day Nurseries at the Royal Institute of British Architects. Lord Horder will take the chair at 10.30 A.M., and other speakers who will discuss problems of establishing war-time nurseries will be Miss Florence Horsburgh, Mr. J. C. Wrigley and Miss Zoe Puxley (Ministry of Health), Miss Greaves (Board of Education), Lady Reading (N.S.D.N.), Dr. G. H. Hogben (M.O.H. for Tottenham), Lady Allen of Hurtwood and Miss Freda Hawtrey (N.S.A.). Further information may be had from the secretary of the association, 8, Endsleigh Gardens, London, W.C.1.

Royal Society of Medicine

A meeting of the clinical section of this society will be held at the Westminster Hospital on Friday, Oct. 10, at 2.15 P.M. The section of orthopædics will meet at Horton Hospital, Epsom, on Oct. 11, at 2 P.M., when short papers will be read and there will be a demonstration of special cases.

Society of Medical Officers of Health

Sir Alexander Macgregor of Glasgow has taken office as president of this society in succession to Dr. F. T. H. Wood of Bootle.

London Homœopathic Hospital

On Thursday, Oct. 9, at 2.30 P.M., Dr. Thomas Stonham will give a lecture introducing the autumn and winter post-graduate session at this hospital. From October to May, on Mondays and Thursdays, at 2.30 P.M., Dr. Charles Wheeler will give a course on homœopathic materia medica and therapeutics, and from October to December, on Fridays at 2.30 P.M., Sir John Weir will give ten Compton Burnett lectures on homœopathic philosophy and prescribing. Tutorial classes and clinical tutorials will also be held throughout the session.

Queen's Nurses

During 1940 the Queen's nurses and village nurse midwives attended 85,242 confinements for which no doctor was engaged, and they also acted as maternity nurse for 36,560 cases for which doctors were engaged. There are now 1530 Queen's nurses and 2782 village nurse midwives, making 4312 in all. This is a decrease of 72 which is said to be due to the reorganisation of the associations and to less work in some coastal areas.

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WESLEY MEMORIAL HOSPITAL

ORIGINAL ARTICLES

CYSTICERCOSIS OF THE BRAIN
WITH EPILEPSY AND PAPILLŒDEMA

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SINCE the work of MacArthur[1] at Millbank, infestation of the brain and eye with the larval cysts of *Tænia solium* has been recognised as less uncommon and more important than was formerly supposed; and it seems likely that infestation with tapeworm will be frequent among our forces in the Near and Middle East. When previously healthy and often comparatively young soldiers, especially any who have been abroad, for example in India, have been invalided out of the service because of "epilepsy," the diagnosis in many instances has, on further investigation, proved to be an infestation with cysticerci. The epileptiform fits were usually accompanied by severe and otherwise unaccountable headaches and various obscure nervous symptoms. In fatal cases, sometimes as many as 300 or 400 cysts have been found in a single brain; and in these patients there has, as a rule, been no definite history of any previous intestinal tapeworm-infestation. Almost all the cases recorded in this country have been in soldiers, or in soldiers' families.

The case which we record here gives a typical clinical history, and also illustrates several other important points upon which MacArthur lays especial emphasis, for instance, that serious cerebral symptoms supervene as a rule only when death and degeneration of the larvæ themselves have taken place; this is because the cysts then tend to swell from imbibition of fluid, and irritative phenomena supervene in and around them (fig. II*b* and lower specimen in fig. IV, plate).

While the parasite is still alive it becomes surrounded and shut off by a zone or capsule of thickened and proliferated glia and a varying amount of fibrous tissue; and, unless the cysticercus is in some specially vital position in the brain, a species of symbiotic harmony between parasite and host is established, which may last for several and perhaps for many years. Serious pathological results thus in many instances ensue only on and after the death of the parasites, so that attempts at killing them by drugs must as yet be regarded as ill-advised, as is also the attempted surgical removal of any of the cysts in the brain, unless they are causing serious symptoms on account of their position, or, as in the present case, because the rather unusual complications of progressive papillœdema and raised intracranial pressure threaten the patient's eyesight.

Since the larvæ often survive "symbiotically" for a number of years, the more active destructive and necrotic changes around them leading to the epileptiform seizures may not come on until after a considerable "latent period." If the patient does not die in the meantime, the zone of glial and fibrous-tissue sclerosis around the dead and degenerating cysticerci gradually becomes more pronounced; and calcification, beginning in the scolex itself and gradually involving the cyst-wall, tends to be produced—perhaps only after three or four years—and X-ray diagnosis may only then become possible.

At this late stage in the development of the disease, the occurrence of eosinophilia in the blood is exceptional, and the specific serum-reactions are often negative. If, as in the present case, cysticerci can be palpated in the subcutaneous or muscular tissues or demonstrated in radiograms, the diagnosis may be confirmed by the examination of biopsy-specimens (fig. I, plate, and fig. II).

CASE-RECORD

A man of 32 was admitted to hospital under Dr. Neill Hobhouse on Jan. 23, 1940, complaining of "fainting turns" for three years, and severe frontal and occipital headaches for a month. A diagnosis of cysticercosis had been made by Dr. Macdonald Critchley in 1938. The patient had been an infantryman in India from 1927 to 1933, and during that time he had a considerable amount of illness, including "dysentery" twice, threadworm-infestation twice, and several attacks of "P.U.O."; but, as far as he himself was aware, he had never suffered from intestinal tapeworm-infestation. Previous to going to India, he had never suffered from fits of any kind, and there was no family history of epilepsy. In 1937 he became a post-office employee, and three months later had his first epileptiform attack, his own description of this being: "I was just walking along when suddenly everything went black and I dropped." He was unconscious for only two or three minutes and was told that he had had generalised twitching of the limbs, but no cyanosis, nor was there any incontinence of urine or biting of the tongue. He had a second attack six months later, beginning with "twitching of both elbows and shoulders." In subsequent fits this twitching constituted a premonitory "aura," giving him time to lie down. These attacks came on at intervals of five or six months, with freedom from any symptoms between times. His last attacks—two in one day—had occurred five weeks previous to admission and began with cramp-like flexion of the fingers of the left hand into the palm and pain shooting up the forearm, followed by unconsciousness, on recovery from which he found that he had temporarily lost the use of his left hand, a disability which lasted nearly a week. Intermittent severe frontal headaches then supervened, shooting round the right side of the head to the occiput, with pain in the back of the neck and mistiness of vision in the right eye. There was no nausea or vomiting. In 1938, a tense subcutaneous nodule about ½ in. in diameter was detected at the right costal margin near the ninth costal cartilage.

The patient was well-nourished, intelligent and fully coöperative. Two other tense and painless subcutaneous nodules about ½ in. in diameter were found in the lower thoracic region, one on each side of the vertebral column about 2 in. from the midline. Cranial nerves: pupils of medium size, equal, central and circular; pupillary reactions normal. Vision 6/12 in each eye; visual fields full. Fundi (Mr. Joseph Minton) showed papillœdema on both sides, + 1·5 D, with hæmorrhage and exudate around both discs. There were coarse lateral nystagmoid jerks both to right and left. Tongue deviated to the right when extended. Other cranial nerves normal. Absent upper abdominal reflexes but no other abnormal physical signs found. No nodules were palpable in the limbs. By Jan. 26 the papillœdema had increased to 3 D in the left eye, and to 2 D in the right; it was therefore decided to perform a ventriculography to ascertain if possible the position of any block in the cerebrospinal circulation.

Jan. 25. Examination of blood. Coagulation-time 3½ min.; bleeding-time not prolonged. Red cells 4,900,000, hæmoglobin (Haldane) 90%, colour-index 0·92; white cells 7400 (polymorphs 47·5%; lymphocytes, small 34·5%, large 10·5%, total 45%; large monocytes 1·5%; eosinophils 6%; basiphils 0)—i.e., a moderate eosinophilia, with some neutropenia and a relative lymphocytosis, a considerable proportion of the lymphocytes being of large (more immature) type.

Jan. 27. Lumbar puncture. Pressure 300 mm. of water; fluid clear and colourless. Cells 29 per c.mm. (small lymphocytes 91%, small endothelial cells 6%, large endothelial cells 3%, polymorphs 0, red cells 0); total protein 0·06%; globulin a faint trace in excess; Lange's colloidal-gold curve, 0 : 1/0 : 1/0 : 1 : 1/0 : 0 : 0 : 0 : 0 : 0. Wassermann and Meinicke reactions in blood negative. On X-ray examination of the skull, two small rounded suspicious shadows (one about the centre of the right parietal cortical region and the other just below and ¾ in. to the left of the shadow of the calcified pineal) were seen in the anteroposterior view but not in the lateral. In the soft parts around the pelvis and in the upper and lower limbs and neck, typical shadows of calcified cysticerci were demonstrated (fig. I).

On Jan. 30 a ventriculography was done, but no abnormality was detected in the ventricular system. The fluid from the right lateral ventricle was clear and colourless and showed: cells 1 (small lymphocyte) per c.mm.; total protein 0·01%; globulin no excess; Wassermann and Meinicke reactions negative; Lange's colloidal-gold curve, 0 : 0 : 1/0 : 0 : 0 : 0 : 0 : 0 : 0 : 0.

The ventriculography was followed by a right subtemporal decompression by Mr. Geoffrey Knight. The meninges were under considerable tension, and on opening them several small firm nodules were palpable just beneath the surface of

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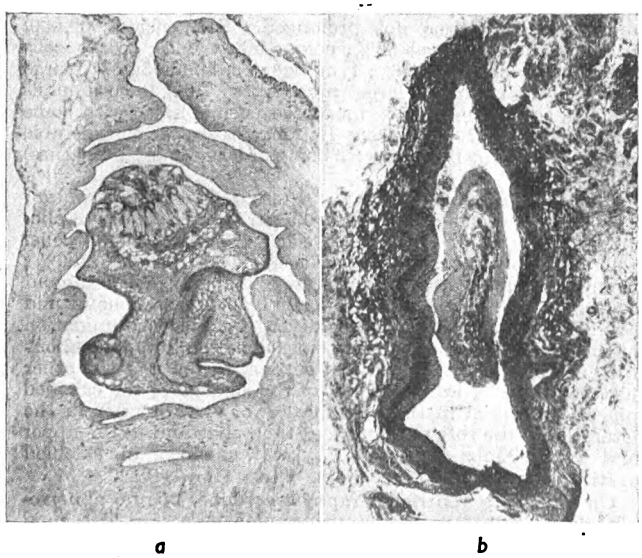
the cortex in both the motor and sensory areas. Two of these were excised for microscopical examination (fig. II*b*). The patient's immediate post-operative condition was good, some temporary paresis of the long finger-flexors of the left hand gradually passing off and there being no appreciable sensory changes. Ten days later the papillœdema had subsided to 0·5 D in the right and 1 D in the left eye, and there was mild analgesia to pin-prick and cotton-wool and two-point discrimination over the left palm. All of these signs gradually passed off except for flexor paresis of the left index finger. On Feb. 9 two subcutaneous cysticercal cysts were removed from the patient's back for biopsy (fig. II*a*).

Feb. 14. The patient had an epileptiform attack similar to those from which he had suffered before admission; and during the subsequent three weeks there was flaccid paralysis of, and loss of sensation over, the left hand and forearm, and several Jacksonian attacks occurred in the paralysed limb. There was then rapid improvement, with return of power of movement, the cortical sensory loss being the last to recover.

On April 3 the patient was discharged in excellent condition, with the decompression-area well healed. The optic discs were flat and showed no evidence of the previous papillœdema, vision being as on admission (R.V. and L.V. 6/12), and there were now no appreciable motor or sensory differences in the two arms.

Figs. II*a* and *b* are from sections of the biopsy-specimens excised from the lumbar muscles and brain respectively. In fig. II*a* the larva is healthy and well-preserved; but, in fig. II*b*, that from the right motor cortex shows a typically degenerated dead larva enclosed in a calcified cyst, previously tensely distended, but which had ruptured and become collapsed during surgical removal. For comparison with these, fig. III is from a post-mortem specimen of a brain of an ex-soldier aged 28, which we owe to the kindness of Dr. C. Worster-Drought. It shows the naked-eye appearance and distribution of the cysticerci in the brain (the right half of which was examined and in which it was estimated that there were about a hundred cysts present).[2] Fig. IV, from this brain, shows in adjacent convolutions in the same section a healthy "symbiotic" cysticercus lying within its caudal vesicle or bladder; while below is a dead and disintegrating larva in a degenerated cyst which is becoming distended with fluid and the wall of which shows the development of irritative and chronic inflammatory reaction after the death of the parasite, as noted by MacArthur. Details of the upper cyst are shown in fig. V.



a *b*

FIG. II—(*a*) Biopsy-specimen of cysticercus from lumbar muscles of case recorded in text. Oblique section of scolex passing through two of the four suckers and base of rostellum with its armature of hooklets and its musculature. Compare the well-preserved structure of this undegenerated and "symbiotic" larva with the dead and degenerated parasite from the brain illustrated in (*b*). This shows one of two cysts removed from the hand-area of the right motor cortex. The cyst, which burst and became collapsed during removal, is partially calcified. Mallory's connective-tissue stain × 50.

DISCUSSION

Attention has been drawn in several recent papers and articles[3] to the comparative frequency with which

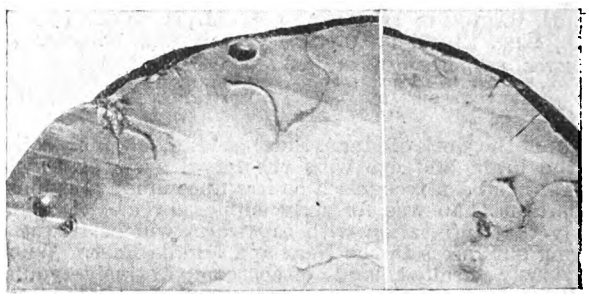


FIG. III—Cysticercosis of brain of an ex-soldier aged 28, who had enlisted at the age of 18. (Left): in, or just beneath, the frontal cortex are one degenerating and two well-preserved cysts; whilst (right) in the occipital cortex are seen one semi-degenerated and shrivelled, and two old degenerated and fibrosed, cysticerci. Dr. Worster-Drought's case, half natural size.

the brain is attacked in patients with cysticercosis—in different series varying from 40 to 75 or 80% of the total number. The eye itself may be the site of infestation which may destroy the sight, as in Worster-Drought's case. Hugh Cairns, in the discussion which followed MacArthur's paper, was of opinion that "there was no place for operative surgery in cases of multiple cysticerci of the brain," and none of the patients he had seen had anything beyond a slight degree of papillœdema. "It was conceivable that there might be such cases (e.g., a cyst in the precentral gyrus) in which surgery could help, but they must be rare." The case we now record appears, therefore, to be one of those rare instances in which sight was threatened by a progressive bilateral papillœdema and the raised intracranial pressure, and in which surgical interference was justified by the results obtained—the rapid disappearance of the papillœdema and the lowering of the intracranial pressure, as well as the reduction in the frequency of the fits following the subtemporal decompression.

In his series of 61 patients with cerebral cysticercosis, MacArthur mentions only one case in which any serious degree of papillœdema led to blindness some time before death; while in Dixon and Smithers's[4] review of 71 cases there were only 7 with papillœdema. More recently, Gottlieb[5] described a case of cysticercosis in a girl, aged 17, with epilepsy, 2 diopters of papillœdema in both eyes, a cerebrospinal-fluid pressure in excess of 300 mm. of water, and numerous calcified cysts in the brain demonstrable radiographically.

As shown in fig. III, most of the cysts lie within the cortex, or just beneath it, relatively few being found in the meninges or deeply within the white matter. Although collectively they represent a considerable space-occupying lesion, individually they produce comparatively little interference with the cerebrospinal-fluid circulation, and this is perhaps the explanation of the relative infrequency of papillœdema or of raised intracranial pressure, the occurrence of which probably indicates swelling of the brain around degenerating cysts such as that illustrated in the lower part of fig. IV. No evidence of hydrocephalus was found in the ventriculograms, which showed a normal ventricular system.

The character of the epileptiform attacks depends largely on the site of the cysts, as well as on the occurrence of the degenerative reaction and swelling around and in the dying or dead cysticerci. The symptoms sometimes produced may simulate those of acute encephalitis, disseminated sclerosis or cerebral tumour; and in some patients, with or without fits, psychical symptoms may predominate and resemble melancholia, acute mania, schizophrenia or certain less grave mental disorders.

When in the subcutaneous tissues and muscles, the swellings, if numerous, may simulate von Recklinghausen's peripheral neurofibromatosis or even nodular leprosy (Greig).[6] As is well known, the cysts when in the muscles and near the surface of the body often become

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palpable or even visible in "crops." This is due to a sudden increase in their fluid-content following the death of the larva, rather than to the development of new parasites—previously flaccid and inconspicuous cysts becoming tense and palpable. It is conceivable that, in a similar way, several cysts in certain parts of the brain, particularly if situated in the vicinity of the mid-brain and below the tentorium, might simultaneously become swollen and obstruct the cerebrospinal-fluid circulation and lead to raised intracranial pressure and bilateral papillœdema, without necessarily producing either hydrocephalus or ventricular distortion, especially in cases seen early.

The diagnosis of cysticercosis of the brain rests primarily on the occurrence of epilepsy or other cerebral symptoms, usually, but not invariably, associated with palpable subcutaneous and intramuscular nodules, and a history of residence abroad, particularly in India. It is confirmed by X-ray appearances and by biopsy when possible. The radiographical appearances are extremely variable, depending on the degree of calcification which may have developed—the brain being usually the last place in which calcification begins. Skin-reactions and complement-fixation tests have not so far proved reliable guides. The presence of eosinophilia is suggestive in the earlier stages of infestation, but is inconstant or absent later. One great advantage of a correct diagnosis is the removal of the fear of hereditary transmission and the stigma of idiopathic epilepsy; in soldiers it does away with the difficulty of obtaining a pension, for the infestation may usually be regarded as a consequence of their military service abroad.

The prognosis, though serious, is not, as has commonly been thought, uniformly bad. In a small proportion of cases—5 in Dixon and Smithers's 71 patients—the fits ceased after a variable period. A decompression operation is justifiable and desirable where, as in the present case, there is raised intracranial pressure and papillœdema; and, in the absence of contra-indications, a right subtemporal decompression serves this purpose.

SUMMARY

A case of *Cysticercus cellulosæ* infestation with focal epilepsy is described, in which there were the unusual features of grossly raised intracranial pressure and rapidly increasing papillœdema, with a normal ventriculogram.

The ventricular fluid was normal; the lumbar-puncture fluid showed a moderate increase of mononuclear cells, protein and globulin, but no polymorphs or eosinophils.

The papillœdema quickly subsided after a right subtemporal decompression which also reduced the frequency of the fits.

Cases of cysticercosis may be more common now that there are large numbers of British troops in the East.

Raised intracranial pressure and papillœdema usually arise from swelling of the brain around degenerating cysts, and are indications for decompression.

Diagnosis is made on the development of epilepsy after residence abroad (especially in India), the presence of subcutaneous nodules, and the X-ray and biopsy findings. Eosinophilia in the blood is of diagnostic value mainly in the earlier stages of the infestation.

The fits sometimes cease spontaneously.

We wish to thank Dr. Neill Hobhouse and Surgeon Captain Macdonald Critchley for putting their clinical notes of the case at our disposal: Dr. Worster-Drought for the specimens from his case; Mr. C. Martin, Mr. R. Egan and Miss M. I. Wilson for preparing the pathological material; and Mr. A. York, assistant radiologist at the hospital, for the radiograms.

REFERENCES

1. MacArthur, W. P. (1933–34) *Trans. R. Soc. trop. Med.* **27**, 343.
2. Broughton-Alcock, W., Stevenson, W. E. and Worster-Drought, C. (1928) *Brit. med. J.* **2**, 980.
3. Blyth, W. (1941) *Ibid*, **1**, 401; MacArthur, W. P. (1941) *Ibid*, p. 492; leading article, *Ibid*, p. 896.
4. Dixon, H. B. F. and Smithers, D. W. (1934) *Quart. J. Med.* **27**, 603.
5. Gottlieb, B. (1936–37) *Proc. R. Soc. Med.* **30**, 577.
6. Greig, E. D. W. (1937) *Edinb. med. J.* **44**, 522.

SILICOSIS IN STOURBRIDGE FIRECLAY MINERS

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STOURBRIDGE fireclay miners have not previously been recognised as exposed to a silica risk, and hitherto silicosis has not been observed in such miners. The investigations here recorded have established the diagnosis of silicosis in three of these workers.

Clays are naturally occurring materials composed of silicates, chiefly of aluminium, usually mixed with an indefinite amount of sand and other minerals. The term "fireclay" is commonly applied to the more refractory clays found in the geological formations known as the Coal Measures. Such clays are found as a rule beneath coal seams, so that workers in these collieries often work in both the coal and the fireclay seams. In the Stourbridge area, where firebricks have been manufactured since 1780 or earlier, the fireclay is found in the "Old Mine" seams of the South Staffordshire coal measures. Immediately above the fireclay in geological formation is a shale called Baxton; the rock below is a "mottled clay," a form of crude sandstone. The Baxton has often to be removed to reach the fireclay. In dealing with the fireclay, the miners make their shot holes with machine drills either in the fireclay rock itself or in the mottled clay. When the shot has been fired, buckets of water are poured over the fireclay to allay the dust and moisten the clay before it is picked and collected. In addition to fireclay mining, the workers in this colliery have worked in the coal seams on occasional shifts when required.

The composition of fireclays varies in the same coalfield. The basic constituents are shown in the following analyses which are extracted from Searle's "Refractory Materials."

	Stourbridge Old Mine	
	Best selected (%)	Ordinary (%)
Silica	76·5	56·6
Alumina	16·5	26·5
Iron oxides	0·8	2·3
Lime	0·1	0·2
Magnesia	trace	0·3
Potash and soda	0·7	1·7

Fireclay in which the contained silica is, as above, in the form of silicates is "pure" fireclay, and as such does not constitute a free silica risk. The fireclay in which the three miners investigated have worked has hitherto been regarded as a pure fireclay. However, a sample of this fireclay was kindly examined under the petrological microscope for me by W. R. Jones, D.Sc., of the Imperial College of Science and Technology, and his report is as follows.

"The sections of the coarser and more coherent lumps of this fireclay show the presence of many grains of quartz, and, in parts, fibres of sericite are fairly numerous. Dried fireclay of this kind could, in my opinion, give rise to harmful dust."

In addition, the following figures show the amounts of total and free silica in Baxton, mottled clay, and samples of dust taken from the floors of the fireclay mine.

	Total SiO_2	Free SiO_2
Baxton	42·6	7·2
Mottled clay	68·2	36·1
Dust from floors	49·6	16·2

The occupational aspect of the problem may require further investigation, but it is evident that the miners are exposed to dust from fireclay containing quartz grains, and that they are also working with a mottled clay which contains a substantial amount of free silica.

CASE 1

The first patient has died and the autopsy report is included.

First seen at the tuberculosis dispensary on May 23, 1934, when aged 47. Had been a coalminer for 5 years from 1906–11, and had then worked for 23 years as a "pure" fireclay miner in the same colliery, returning to work in the

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coal seams on occasional shifts when required. Complained of chronic cough with sputum for years, dyspnœa on exertion for several months, and pains in right side of chest. Previous attacks of right-sided pleurisy in 1930 and 1931.

Low standard of physique; general condition poor. Chest expansion restricted particularly on right side. Percussion slightly impaired over right apex. Breath sounds poor generally; generalised rhonchi. Clinically condition appeared to be due to chronic bronchitis and emphysema. To eliminate possibility of pulmonary tuberculosis radiogram was taken March 29, but film revealed appearances consistent with early pneumoconiosis. Decided to watch future course, radiological examinations being repeated at intervals. Advised to give up colliery work. Clinically remained much the same until February, 1936, when dyspnœa became worse; physical signs did not alter much apart from increasing impairment of percussion over both upper lobes. Possibility of tuberculous infection was always borne in mind, but numerous sputum tests, as well as guineapig inoculation, always negative. General condition gradually deteriorated, dyspnœa, aggravated by repeated attacks of acute bronchitis, being main symptom. In February, 1941, seven years after ceasing work, he died suddenly.

Radiological examinations.—Serial films reveal a striking and progressive fibrosis, and appear to present three stages:

Stage 1. In fig. III*a* (plate), taken in 1934, configuration of chest is normal; heart and mediastinum normal; root shadows do not appear enlarged; well-marked increase of striation with mottling throughout lower two-thirds of both lungs, most towards bases. Dr. A. Meiklejohn, who kindly saw the film at the time, stated that "in many ways the picture is consistent with silicosis as seen in certain branches of the pottery industry. There is one striking anomaly—the distribution is chiefly confined to the lower parts of the lungs as in asbestosis, whereas silicosis is usually almost identical in distribution with tubercle."

Stage 2. Fig. III*b*, taken in 1935, reveals denser shadows becoming more confluent in mid-zones of both lungs and in right upper lobe. Increasing translucency at bases, indicating emphysematous changes.

Stage 3. Fig. III*c*, taken in 1940, shows large dense opacities in mid-zones and right upper lobe. Basal appearances suggest "ballooning."

Despite cessation of exposure to dust, condition was progressive. The evidence of emphysema appears to increase with density of shadows denoting fibrosis. Later films appear to suggest infective type of silicosis, but tuberculosis was conspicuously absent as will be seen later in pathological report.

Post-mortem report (Dr. W. Stewart of Worcester).—Body rather emaciated and subcutaneous œdema present in lower limbs. Left lung completely free from chest wall except for very few apical adhesions. Right lung more densely adherent to pleura in upper and middle lobes; adhesions could only be broken down with difficulty. No free fluid. Pericardium normal but external surface showed considerable pigmentation with carbon; myocardium flabby and chambers dilated. Myocardium showed increased fatty infiltration; coronary arteries affected by slight atheromatous changes. No valvular lesion. Liver showed well-marked nutmeg changes; other abdominal organs normal.

Left lung weighed 800 g. (normal 570); voluminous and deeply pigmented with carbon. Upper lobe showed considerable thickening of pleura and much old scarring. Large emphysematous bullæ present, largest being size of golf ball. Scattered throughout lung tissue were small fibrous nodules but not so abundant as in typical silicosis. Lower half of lobe coal-black and composed of dense fibroid tissue containing very little air. No discrete nodules of fibrosis made out in this mass; pleural thickening more pronounced over this area. Fairly dense interlobar adhesions. Lower lobe showed similar pleural thickening; emphysema, particularly on diaphragmatic surface, most pronounced, bullæ being size of small Jaffa orange. Upper part of this lobe also showed fibrosed area with similar deep carbon pigmentation. No evidence of tuberculosis. Hilar glands enlarged to size of small beans.

Right lung weighed 960 g. (normal 625); appearance similar to left but pleura showed more thickening. Upper lobe voluminous; most of lobe, except about lower third anteriorly, solid mass of old fibrous tissue and very deeply pigmented. Scattered small fibrous nodules also present. Middle lobe fairly densely fused to upper and lower lobes and completely fibrotic. Lower lobe not quite so solid except at upper pole. Emphysema very advanced. In deeper substance of all lobes small bronchiectatic cavities slightly smaller than peas. No macroscopic tuberculosis obvious.

Bronchi showed chronic bronchitis with increased vascularity in walls.

Histological examination.—Right lung. Upper lobe: extremely heavy impregnation with dust particles obscured tissue appearances; considerable fibrosis of laminated whorled type enmeshing dust particles, lung alveoli having completely disappeared in fibrous mass; arterial walls considerably thickened. Lower lobe: patchy areas of deep pigmentation; lung alveoli distended and walls thinned; considerable engorgement of vessels; silicotic and anthracotic fibrosis present. *Left lung.* Upper lobe: deep pigmentation, patchy in type and somewhat intensified around blood-vessels; considerable pigment in lymphatic channels; silicotic fibrotic nodules present. Lower lobe: in solid portion appearances similar to those in other lobes, but silicotic fibrosis more definite.

The pulmonary lesion is, therefore, one of chronic fibrosis, in the production of which both silica and coal dust appear to have played a part; it thus conforms to the type of pulmonary fibrosis described as silico-anthracosis.

Chemical analysis of portions of dried lung was made as a matter of interest.

	Total SiO_2 (%)
Right upper lobe	4·9
Right lower lobe	3·9
Left upper lobe	2·2
Left lower lobe	2·2

The silica content of normal lungs is up to 0·2% on the weight of dried lung. The lungs therefore contained increased amount of silica in the tissues. Stewart (1933), however, found that an abnormal silica content in lung tissue cannot be taken as corroborative evidence of silicosis. King and Belt (1940) also found no evidence of a direct association between the concentration of silica and the degree of fibrosis, but pointed out that in silicotic lungs silica was always in excess of 0·2%.

The two other cases to be described are still alive but very much incapacitated. (See cases 2 and 3 on p. 419.)

LEGENDS TO ILLUSTRATIVE PLATE

DR. CARNEGIE DICKSON AND CAPTAIN WILLIS

FIG. I—Radiograms of soft tissues, showing calcified cysticerci, mostly in muscles. (*a*) Near left elbow; (*b*) at upper and outer aspect of left thigh. Natural size.

FIG. IV—Paraffin section through two adjacent specimens of the bladder-worms of *Tænia solium*, the pork-tapeworm, from the frontal cortex (see fig. III) of Dr. Worster-Drought's case, a soldier home from India who died at the age of 28 after suffering from epileptiform fits and cysticercosis of the left eye for 6 years. The upper specimen is a well-preserved and "healthy" or "symbiotic" scolex, lying within the invagination of the wall of the little bladder which in turn has been derived from the main caudal vesicle or bladder from which the larva gets its name "cysticercus." The lower specimen in the figure is an example of a dead and disintegrating parasite showing accumulation of fluid in the cyst and an inflammatory reaction at its periphery—i.e., the stage at which it becomes more irritative and dangerous to its host. Mallory's connective-tissue stain × 12.

FIG. V—Higher magnifications of the upper cyst illustrated in fig. IV, showing details of the scolex and its caudal vesicle. In the section of the anterior end of the scolex, passing obliquely through the muscular rostellum, the double circlet of hooklets and two of the four suckers are seen. Mallory's connective-tissue stain (*a*) × 20; (*b*) × 60.

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FIG. I—Case 2, showing lesion mainly in mid-zone.

FIG. II—Case 3, showing dense opacities in right upper zone, irregular opacity in right mid-zone, and opacities in left mid-zone.

FIG. III—Case 1, showing progressive fibrosis in mid-zones and right upper zone. (*a*) 1934; (*b*) 1935; (*c*) 1940.

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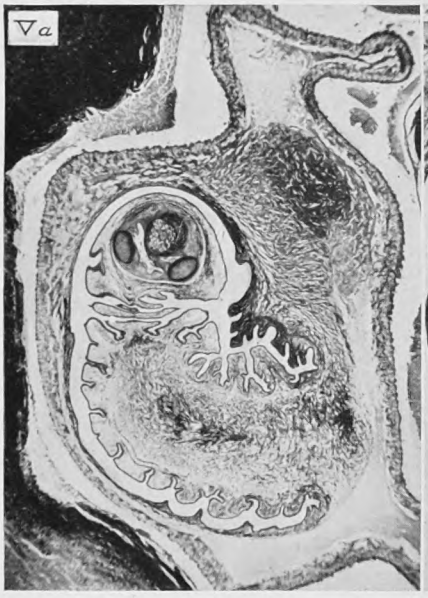
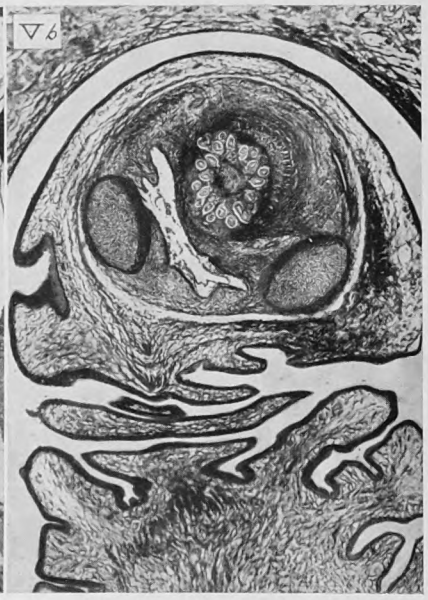
DR. CARNEGIE DICKSON AND CAPTAIN WILLIS: CYSTICERCOSIS OF THE BRAIN





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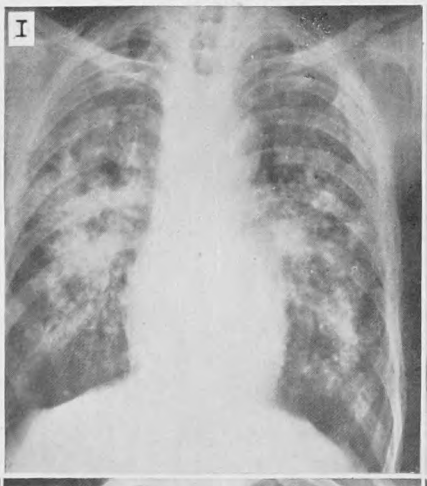
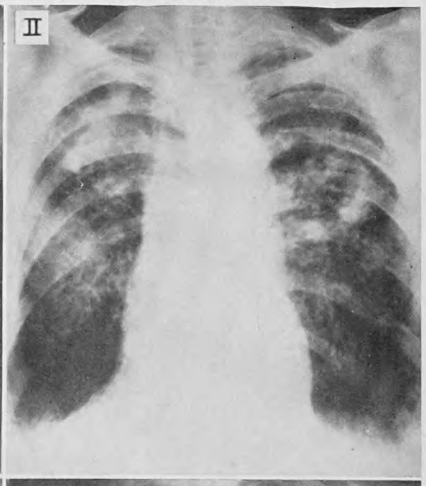
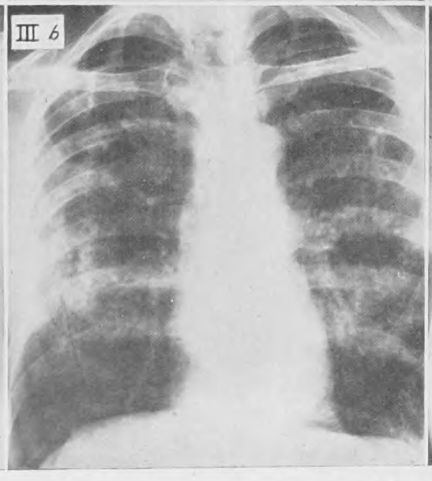
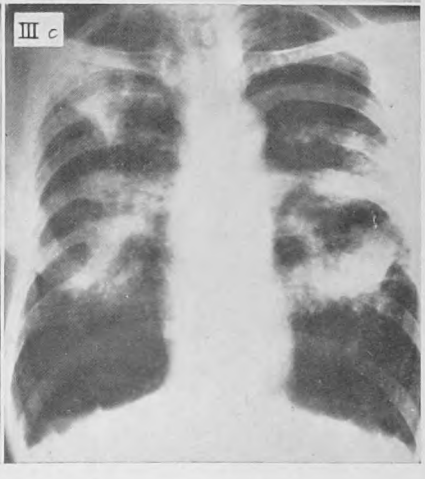
DR. DEANER: SILICOSIS IN STOURBRIDGE









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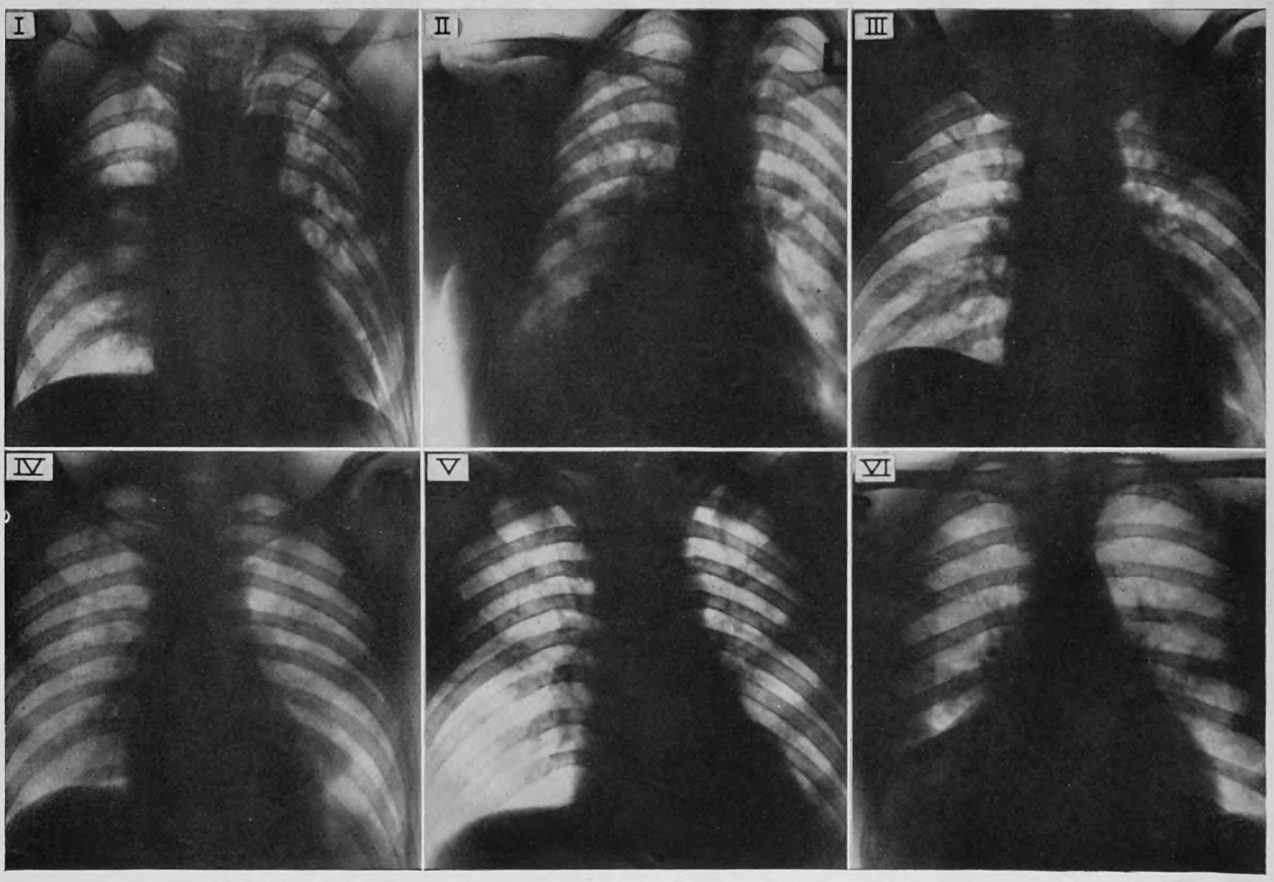
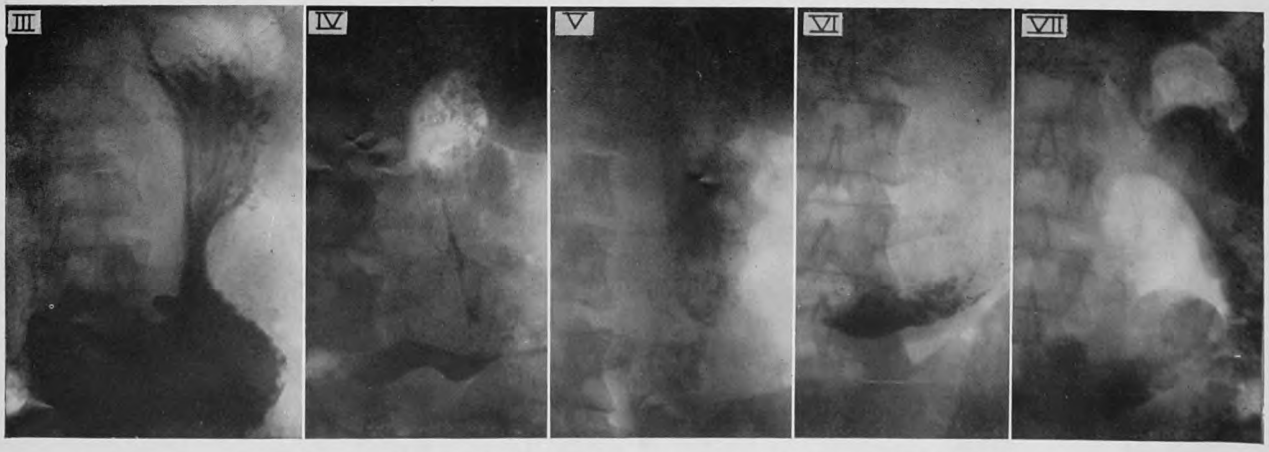
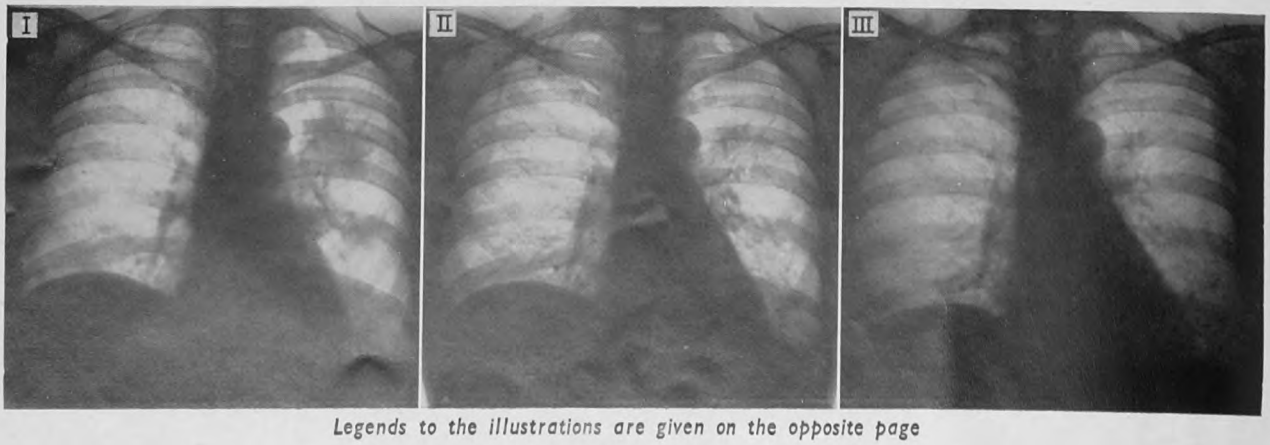
DR. O'REILLY AND DR. GLOYNE: BLAST INJURY OF THE LUNGS



DR. ALSTEAD: BISMUTH CARBONATE IN GASTRIC DISEASE



DR. CLARK: A CASE OF SYPHILIS OF THE LUNGS



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CASE 2

Man of 56 who has been a clayminer, in same colliery as first case, for past 36 years. Has also been required to work at coal on occasional shifts. Chronic cough with sputum for some years. Attacks of dry pleurisy on right side of chest in 1937 and in January, 1939. Increasing dyspnœa on exertion for past 3 years, with gradual loss of weight during the past year. Gave up work on July 19, 1940.

Low standard of physique and general condition poor. Chest movement restricted, particularly on right side. Percussion note impaired over both apices, but very few adventitious sounds heard. Had been admitted to sanatorium as case of pulmonary tuberculosis. Sputum tests, culture, and guineapig inoculation all negative for tuberculosis.

Radiological examination (fig. I) shows slight tracheal deviation to right. Heart normal. Root shadows not enlarged. Distribution of lesion definitely in mid-zones. On right side dense irregular opacity, rather soft in appearance, tending to spread slightly into upper and lower zones; clear area near root suggests patch of emphysema rather than breaking down. On left small irregular opacities with mottling in mid-zone, not so confluent as on right.

CASE 3

Man of 63, brother of case 2. Worked in same mine as two previous cases as clayminer for 45 years. Conditions of work similar. Cough with sputum for past 3–5 years, with increasing dyspnœa and loss of weight. Early in 1940 had been off work because of pleurisy in right side of chest. Ceased work finally on July 10, 1940, because of further pain on that side and extreme weakness.

Poor physique and general condition very poor. Restricted chest movement. Percussion note impaired over both upper lobes. Crepitations over both apices, right more than left; diminished air-entry at bases. So far, sputum tests negative for tubercle bacilli.

Radiological examination (fig. II).—Ribs on right side more sloping than left. Tracheal deviation to right. Mediastinal shadow widened; right side of heart enlarged. Root shadows not enlarged. On right dense opacity in the upper zone and irregular opacity in mid-zone; emphysematous changes at base. On left opacities in mid-zone, with mottling towards base.

Cases 2 and 3 have since applied to the Silicosis Medical Board and have received certificates of disablement by reason of silicosis.

LEGENDS TO ILLUSTRATIVE PLATE

DR. O'REILLY AND DR. GLOYNE

FIG. I—Case 2, within 12 hours of injury. Heavy mottling of whole left lung field and right mid-zone.

FIG. II—Case 3, about 48 hours after injury. Heavy mottling of both lung fields. Consolidation at right base.

FIG. III—Case 4, about 30 hours after injury. Heavy mottling of left lung field; less on right.

FIG. IV—Case 5, small pneumothorax at left base with mottling of left lung field.

FIG. V—Case 6, 24 hours after injury. Characteristic mottling of both lung fields, but less than in previous cases.

FIG. VI—Case 7, 54 hours after injury. Collapse of right base. Subsequent films showed re-expansion and resolution.

DR. ALSTEAD

FIG. III—Immediately after barium meal, showing penetrating ulcer on lesser curvature.

FIG. IV—Taken 2 min. after gr. 30 of bismuth carbonate. Pool in most dependent part of stomach; trace adhering to mucosa of body of stomach.

FIG. V—Taken 27 min. after meal of toast and milk and 2 min. after taking gr. 30 of bismuth carbonate. Showing dispersal of bismuth carbonate among stomach contents; bulk of salt still in middle of body of stomach.

FIG. VI—Taken 1½ hours later. Stomach emptying; remaining bismuth carbonate has collected at most dependent part of stomach; none elsewhere.

FIG. VII—Residue of bismuth carbonate after 28 hours. Previous barium meal had shown normal emptying time.

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FIG. I—Radiogram on first attendance (March 2, 1939), showing large opaque area in left upper zone, with smaller opacity near root.

FIG. II—Radiogram on April 20, 1939, showing considerable absorption of opacities.

FIG. III—Radiogram on Jan. 20, 1941, showing still further improvement.

DIAGNOSIS

The International Conference on Silicosis in 1938 defined the disease as "a pathological condition of the lungs due to the inhalation of silicon dioxide," the silica being in a free or uncombined state. During life, the diagnosis depends essentially on:

1. An occupational history revealing sufficient exposure to a silica risk.
2. Radiological findings.
3. Clinical examination.

In an industry presenting a well-established occupational silica risk, where in a large number of cases careful correlation has already been made between the radiological appearances and the pathological findings, the diagnosis in a given case is relatively easy when clinical and X-ray findings are suggestive. Where, however, a silica risk has yet to be proved, during life only a tentative diagnosis is possible even with extensive radiological experience of silicosis in other industries. This was the position when the first case in this series was seen in 1934. The autopsy and histological findings described above now establish the condition as silico-anthracosis, and it is therefore now possible to review the criteria of diagnosis in these cases.

Occupational history, and exposure to silica risk.—That the rock at which these men have worked can no longer be regarded as pure fireclay has been shown by the demonstration of the presence of quartz grains; the adjacent rocks also contain free silica. But it is difficult to account for the intense pigmentation with carbon as seen post mortem, for there does not seem to be sufficient exposure to coal dust. It has been suggested by Cummins and Sladden (1930) that anthracosis requires for its development preceding damage of the lung by silica. Had the men worked for an appreciable time in the coalmine it might be suggested that the primary risk causing silico-anthracosis lay there, but there appears no doubt that most of their time has been spent at the fireclay. This aspect of the occupational problem requires further investigation. Our main concern, however, has been to show that the men are exposed to a free silica risk, a criterion necessary for the diagnosis of silicosis.

2. *Radiological findings.*—The series of films in case 1 illustrate the progression from reticulo-mottling to coalescence and final dense fibrosis. The initial basal distribution is unusual; it suggests the predominance of interstitial fibrosis associated with silicosis due to mixed dusts as against the nodulation seen in pure silica inhalation. The films of the two other cases represent the advancing stages of coalescence; the appearances are not so well defined as in the first case, and the infective element strongly suggests itself. The distribution is, characteristically, mid-zone. It is to be noted that the root shadows are not abnormally enlarged.

3. *Clinical history and examination.*—Poor physique and cough with sputum were noted in each case, but dyspnœa on exertion was the main symptom. Pain was also a well-marked feature, probably associated with the formation of adhesions. The loss of weight in the last two cases may arise from an infective element, especially as they are brothers, although so far tubercle bacilli have not been found in the sputum. Physical signs in the first case suggested chronic bronchitis and emphysema; in the second case they were indefinite; in the third they were suggestive of tuberculosis. It will be seen, therefore, that the clinical history and examination is typical of silicosis, but the diagnosis cannot be based on clinical examination alone, although this is essential in assessing incapacity.

* * *

It seems reasonable to suggest that these clayminers should benefit from the provisions made for the compensation of silicosis. It is possible that they are already covered by the Various Industries (Silicosis) Scheme 1931,

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especially having regard to a decision in the House of Lords (1935), when workers breaking down shale, which though not silica rock in itself, contained small lenticles of quartz, were considered to be in an occupation scheduled under that act.

SUMMARY

Stourbridge clayminers are exposed to dust containing free silica.

A case is described in which the autopsy reveals that the pathological condition is silico-anthracosis.

Two other cases are described with similar occupational and medical histories and radiological appearances; these are therefore presumed to be suffering from the same pathological condition.

These clayminers should be eligible for compensation under the provisions made for cases of silicosis.

My thanks are due to Dr. A. Meiklejohn for standing godfather to this paper; to Dr. W. Stewart and Dr. Leslie Bold for their coöperation; to Mr. H. E. Monk, F.I.C., and Mr. E. R. Nind, F.I.C., for their work on the chemical analysis, and the colliery authorities for their courtesy and help; finally, to Mr. F. Fitzhugh for his help in the preparation of this paper.

REFERENCES

Cummins, S. L. and Sladden, A. F. (1930) *J. Path. Bact.* **33**, 1095.
Fowweather, F. S. (1939) *Analyst*, **64**, 779.
House of Lords (1935) Morgan *v.* Amalgamated Anthracite Collieries Ltd. Hutchings *v.* same. Butterworth's Workmen's Compensation Cases, London, vol. XXVIII, 358.
King, E. J. and Belt, T. H. *J. Path. Bact.* **51**, 269.
Searle, A. B. (1924) Refractory Materials, London.
Stewart, W. (1933) *Bgham med. Rev.* **8**, 114.

A CASE OF SYPHILIS OF THE LUNGS

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THE scarcity of recorded cases of syphilis of the lungs may partly be due to the infrequency with which it is recognised and the belief that antemortem diagnosis cannot be established.[1] The object of publishing this case is to show that a diagnosis can be arrived at during the patient's life and to help in establishing clinical data on which a diagnosis can be made.

A widow, aged 54, was asked to attend a clinic under the tuberculosis scheme because she had been notified as suffering from "tuberculous disease of the malar bone." Her occupation was domestic duties. Apart from an intractable ulcer on her left leg in 1927 she had always been healthy until 1936, when she began to suffer from cough, with small amounts of sputum streaked from time to time, lassitude and dyspnœa. Dyspnœa had only become pronounced during the previous few months, when her duties had become too much for her. Has one grown-up son. No history of miscarriage. Her husband died in 1919 at the age of 37 from "growth on the brain." First sought medical advice for a swelling over the left temporo-frontal region which developed in 1937 and for which she received treatment from her doctor for 8 months. The swelling was excised at the local hospital in January, 1938, but a chronic discharge persisted until December, 1938. About this time she developed a similar swelling over the left malar bone which was incised at the same hospital in November, 1938.

At her first attendance at the clinic on March 2, 1939, the lower of the two incisions was weeping slightly while the upper had healed completely. Weight 8 st. 5½ lb.; best known weight 10 st. The chest was symmetrical. Some restricted movement of the left upper half where the percussion note and air entry were impaired but no adventitious sounds were detected. Apex-beat in normal position. Heart-sounds normal. B.P. 145/95 mm. Hg. Pulse-rate 70 per min., regular. Mentality and memory good. Pupils equal and reacted to light and accommodation. No objective sensory changes. Complained of pain over left femur not unlike tabetic pains. No rombergism. Tendon reflexes normal. Healed ulcer with tissue-paper appearance over upper end of left fibula. No tubercle bacilli found in sputum (no further examinations made because cough had gone by next attendance). Blood Wassermann and Kahn reactions ++. Radiogram of chest on March 2 (fig. I, plate): arch of aorta slightly prominent and contains a calcified plaque; left upper zone contains a large opaque area irregular in outline from which radiate processes connecting it with a similar but smaller opacity in lower zone lying near root.

For various reasons only ambulatory treatment could be undertaken. Antisyphilitic treatment was instituted immediately the true cause of the lesion was suspected. She attended a local treatment centre—and still continues to do so, for her Wassermann and Kahn reactions are still positive. She was asked to attend for X-ray examination fortnightly but failed to do so, and her second attendance was not until April 20, 1939, when the film (fig. II) already showed considerable absorption of the opacities originally noted. Her symptoms, too, were much improved; she could do a day's work and walk upstairs without undue dyspnœa; her cough had disappeared; the sinus over her left malar bone had healed. Further radiograms showed progressive improvement. At her last attendance on Jan. 20, 1941, she was in "better health than ever" (fig. III). Despite "winter colds" there is no persistent cough. Weight 8 st. 10½ lb.

This appears to be a case of the gummatous form of lung syphilis.[2] The criteria on which the diagnosis is based are:

(1) Length of history.
(2) Positive serological findings.
(3) Absence of tubercle bacilli in sputum.
(4) Prompt relief of symptoms and progressive, rapid and maintained improvement in X-ray appearances following antisyphilitic treatment.
(5) Presence of syphilitic lesions elsewhere.

I should like to thank Dr. T. W. Stallybrass, the county M.O.H., for permission to publish this case, and Dr. T. V. Cooper, the county pathologist, for the laboratory investigations.

1. Karshner, R. G. and Karshner, C. F. Syphilis of the Lung. *Ann. Med. Hagerstown*, 1920, **1**, 371.

2. Shanks, S. C., Kerley, P. and Twining, E. W. Text-book of X-Ray Diagnosis, London, 1938. Vol. I, p. 269.

ACTION OF BISMUTH CARBONATE IN GASTRIC DISEASE

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THE gastric antacids and sedatives constitute an important group of therapeutic agents, and it is comparatively easy to confirm their effectiveness. In certain kinds of gastroduodenal disease temporary relief of pain consistently follows the administration of an antacid in a high proportion of cases. The action of these compounds on the pH of the gastric contents is also demonstrable by observations made in the course of fractional test-meals.

Bismuth carbonate and bismuth subnitrate are included in this group of drugs. The employment of these basic salts of bismuth dates from the use of the subnitrate by Odier in 1803. It is noteworthy, however, that he used this salt in doses of only one grain and always prescribed with it magnesia (gr. 10) and sugar (gr. 10).* Odier thought this compound powder an infallible remedy for gripe, and since then bismuth preparations have enjoyed a vogue in the treatment of gastroduodenal lesions. MacKenna (1931), in a paper on the history of bismuth, mentions that in 1852 Chambers in England, and Kussmaul in Germany, advocated bismuth salts in the treatment of gastric ulcer; Kussmaul recommended the subnitrate in doses of 10–20 grammes daily. In recent years bismuth subnitrate has fallen into disrepute, after the publication of a number of cases of nitrite poisoning attributed to the reduction of the nitrate by intestinal bacteria. Bismuth carbonate, on the other hand, is still widely used in the treatment of gastroduodenal disease, especially in cases of peptic ulcer and gastritis. According to standard works on pharmacology (Cushny 1941, Poulsson 1940, Dilling 1940) this insoluble salt acts mainly by coating the gastroduodenal mucosa, thus behaving as a protective in much the same way as a

* In the third edition of Odier's Manual, published in 1821, the author is less conservative and recommends the "white oxide of bismuth" in doses of gr. 6–12 four times daily. He also states that he discovered the remedy in 1786.

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dusting powder soothes an irritated skin. Hurst (1929), however, describing a series of radiological observations made by his collaborator Dr. P. J. Briggs, states that "half an ounce of bismuth oxycarbonate taken in suspension on an empty stomach does not as a rule adhere to

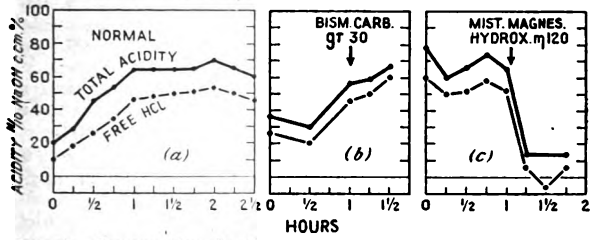

FIG. I—Consecutive fractional test-meals from one patient. (*a*) Normal record. (*b*) With bismuth carbonate 30 gr. acidity continues to rise. (*c*) With mist. magnes. hydrox. m 120 there is a large immediate fall in acidity.

the ulcer crater surface of even a large gastric or duodenal ulcer." Bismuth carbonate is also reputed to have an astringent action on the stomach (Adams 1939), and to act as a weak antacid (Dilling 1940, Whitla 1933). The antacid value of bismuth carbonate has been carefully studied by Freezer, Gibson and Matthews (1928). They have shown that when 0·3% hydrochloric acid (pH 1) is mixed with an excess of bismuth carbonate the solution never attains neutrality, but remains persistently acid (pH 4); and no further reaction takes place after one minute. They also tabulate their conclusions regarding the relative efficiency of the "alkalis" expressed as a comparison with sodium bicarbonate, which is assigned an arbitrary value of 100; the figures for magnesium oxide, calcium carbonate and bismuth carbonate are 317, 20 and zero. Again, Clark (1940) points out that the acidity of the gastric juice secreted by a normal person in 24 hours corresponds to about 5 g. of pure hydrochloric acid; and whereas this is neutralised by 3 g. (gr. 45) of magnesia, as much as 136 g. (gr. 2000) of bismuth carbonate would be required.

PRESENT INVESTIGATION

The object of this investigation was to determine the value of bismuth carbonate in relieving the pain of gastroduodenal disease, and to examine the views commonly accepted as to the fate of this salt in the stomach.

Antacid action.—The in-vitro experiments of Freezer, Gibson and Matthews referred to show that, although the addition of bismuth carbonate to weak hydrochloric acid raises the pH the reaction of the mixture never approaches neutrality. My own observations were made using open test-tubes instead of the closed apparatus described by these workers, but the results were substantially the same. A quantity of bismuth carbonate (B.P.) weighing 1·5 g. was shaken up in a wide tube with 15 c.cm. of distilled water, and 15 c.cm of N/10 hydrochloric acid (pH 1) was then added. The mixture was filtered and the pH of the filtrate was found to be in the region of 3·3. The same result was obtained when similar mixtures had been allowed to stand for intervals ranging from 1 to 10 minutes. Hydrogen-ion concentration was determined by means of chemical indicators and the Lovibond comparator, and the figures are regarded as being only approximate. These rough estimations of the neutralising power of bismuth carbonate on decinormal HCl were carried out merely as a preliminary to similar observations on gastric juice. It was found that the addition of an excess of bismuth carbonate to gastric juice in vitro produced only slight changes in acidity, as is shown by the following example:—

	Decinormal HCl c.cm. % Free HCl	Total acidity	pH
Before addition of bism. carb.	40 ..	55 ..	2
After excess bism. carb.	32 ..	50 ..	2·1

The feebleness of the antacid action on gastric juice is probably partly due to the buffering effect of mucoprotein.

The third method of investigation consisted in making observations during fractional test-meals. In any individual, however, day to day variations in fractional test-meal results are so considerable that experiments of this type necessarily lack controls that are completely satisfactory. The nearest approach to obtaining adequate control readings consists in using the first three or four of a series prior to the administration of the drug under investigation. Although this method is imperfect its value is increased when applied to a drug whose potentialities are already known from in-vitro experiments; and the negative results from bismuth carbonate are more convincing when compared with the effect of the powerful antacid magnesium hydroxide (fig. I). In all, 9 patients were investigated by means of fractional test-meals, using half-drachm doses of bismuth carbonate. It was found that the acidity was unchanged or continued to increase in 7. In 2 who had very low acidity (corresponding to 10 and 20 c.cm. N/10 NaOH% respectively) the curves fell to zero after the administration of the salt; that these falls were spontaneous rather than the effect of the bismuth carbonate is suggested by the fact that the addition of an excess of bismuth carbonate to gastric juice in vitro never reduced the acidity by more than 10 c.cm. N/10 HCl%.

The effect of administering a single large dose of bismuth carbonate was also studied. Two fractional test-meals were performed on a healthy medical student. During the first he received an average dose (gr. 15). It will be seen (fig. II*a*) that the fall in the gastric acidity was negligible; indeed the curves reveal that spontaneous alterations were greater than the change attributed to the action of the bismuth carbonate. On another occasion he was persuaded to take a very large dose (gr. 210). The effect on the gastric acidity was more impressive (fig. II*b*) but it lasted only half an hour. My colleague Mr. J. B. Pettigrew estimated the hydrogen-ion concentration of the samples electrometrically and found that the change was comparatively small (pH 1·67 to pH 2·16). The bismuth carbonate and bismuth oxychloride which

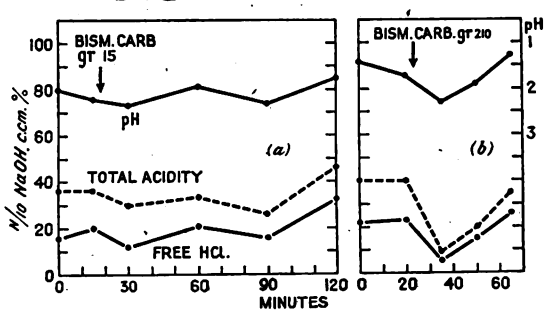

FIG. II—Consecutive fractional test-meals from one patient showing effect of (*a*) gr. 15 and (*b*) gr. 210 of bismuth carbonate on gastric acidity.

were present in all the samples of gastric juice appeared to have caused the mucus to form curd-like masses.

Astringent action.—Bismuth carbonate can act as an astringent in the stomach only if it is sufficiently soluble in the gastric juice. Dissolved bismuth can be detected by adding to it a freshly prepared solution of stannous chloride in strong caustic soda; the bismuth salt is immediately reduced and is precipitated as metallic bismuth, which gives colours ranging from jet black to light brown according to the quantity of the metal present. The test is sufficiently sensitive to detect 1 part of bismuth in 400,000. By this means it was found that after mixing 0·3% hydrochloric acid with an excess of bismuth carbonate the amount of bismuth in the filtrate was not more than 1 part in 160,000. To test the astringency of this concentration of bismuth, a sample of the filtrate was added to an aqueous solution of egg-albumin. No coagulum was produced, indicating that the astringent effect of the dissolved bismuth was negligible. The question arises as to whether bismuth carbonate is soluble in the organic acids of the gastric juice. It has been shown that lactic acid is formed in the stomach only when free hydrochloric acid is absent or diminished—less than 20 c.cm. N/10%. The solubility of bismuth carbonate in N/10 lactic acid was estimated. It was found to be approximately 1 part in 300,000. Here again, no astringent action was perceptible when measured by the effect of the solution upon

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egg-albumin. As a control, the same solution of egg-albumin was used to demonstrate the astringency of dilute solutions of tannic acid (B.P.). Coagulation of the protein was readily produced by a 0·05% solution of tannic acid.

The solubility of bismuth carbonate in gastric juice was investigated. Samples of juice were obtained from 4 patients; the total acidity ranged from 10 c.cm. to 56 c.cm. N/10% and the free hydrochloric acid from zero to 48 c.cm. N/10%. The samples were mixed with an excess of bismuth carbonate and kept at body-temperature for two hours. Some of the juice was then decanted and tested for dissolved bismuth. The stannous-chloride test gave a negative result in all cases.

The conclusion that only a minute trace of bismuth dissolves in weak hydrochloric acid is not incompatible with the observation that bismuth carbonate can increase the pH of the solution. In the presence of hydrochloric acid bismuth carbonate forms bismuth oxychloride, and thus, within certain limits, it diminishes the hydrogen-ion concentration. The following test was done to demonstrate this action.

An excess of bismuth carbonate was added to about 50 c.cm. of hydrochloric acid which had a pH of 0·7. The mixture was shaken and set aside for a few minutes. It was then filtered and the filtrate was found to have a pH of 1·1. The residue was washed with distilled water until free of hydrochloric acid—that is, until the washings failed to give a precipitate with silver nitrate—and it was then dissolved in nitric acid (B.P.). About 5 c.cm. of the nitric-acid filtrate was tested for chloride by means of silver nitrate. A heavy white precipitate formed, proving that abundant chloride was now present in solution. As a "blank" bismuth carbonate was dissolved in strong nitric acid; this solution gave no precipitate with silver nitrate.

Radiological findings.—Seventeen observations were made on 12 patients, 2 of whom had large penetrating ulcers (about 1·5 cm. in diameter) situated on the lesser curvature approximately 7 cm. from the pylorus (fig. III, plate). On screening while the patient was standing, the aqueous suspension of bismuth carbonate was seen to trickle in a narrow stream to the most dependent part of the stomach where it formed a shallow pool (fig. IV). A small proportion remained in the track between the cardia and the lowest part of the greater curvature. There appeared to be no tendency for the drug to distribute itself over the whole lining of the stomach; and no evidence was obtained for Cushny's (1941) statement that bismuth carbonate "is later distributed evenly over the surface and forms a continuous sheet over any ulceration. . . ." Even after appropriate manual palpation and alteration of the patient's posture the distribution of the bismuth carbonate was not permanently altered; with the resumption of the erect posture the pool immediately reappeared in the original position. Repeated efforts to fill the large ulcer craters failed even after giving gr. 90 of the drug.

Nine of the patients were investigated to discover the effect of taking a meal about half an hour after a dose of bismuth carbonate. They received 2 g. (gr. 30) of the salt about half an hour before breakfast and a radiological examination was made 2 hours later. In 5 of this series there was no sign of the drug; apparently it had mixed with the foodstuff and was carried through the pylorus during the early stages of emptying of the stomach. In the remaining 4 patients a variable amount of the drug had been retained at 2 hours; it was invariably confined to the prepyloric region of the greater curvature as in fig. VI. Complete disappearance of the salt was accelerated by the taking of more food. In one patient, however, it persisted for at least 28 hours although five meals had been taken during this time (fig. VII). When there was food in the stomach at the time of administration of the drug, the suspension of bismuth carbonate was seen to follow the usual course, but the stream was soon broken up into several smaller ones by the food masses, and the bulk of the salt accumulated about the middle of the body of the stomach. Thereafter the drug gradually dispersed and became intimately mixed with the gastric contents (fig. V).

Therapeutic tests.—Observations were made on 21 male patients admitted to a medical ward of Stobhill Hospital on account of abdominal pain thought to be associated with abnormalities of the stomach or duodenum. After the usual clinical examination the patients were investigated radiographically, a fractional test-meal was done, and the stools were tested for occult blood. The patients were given the ordinary ward diet. Each patient was then presented with a batch of 18 powders; 6 of these contained bismuth carbonate gr. 30, coloured pink with a trace of azorubrum (B.P.C.); 6 were composed of lactose, the quantity (gr. 40) having a similar bulk to the bismuth carbonate powders, and these were tinted with methylene-blue; 6 were made of dried milk, which had a natural light yellow colour.

The choice of substances that can be used as controls is very limited. Many compounds which are inert when applied externally act as adsorbent antacids in the stomach. Lactose appears to be the only substance, easily obtainable, which is entirely satisfactory. Milk is an antacid, neutralising its own volume of gastric juice (Freezer et al. 1928), and powdered milk must be regarded as an antacid when adequate quantities are used. In doses of about gr. 30, however, this effect is hardly likely to be appreciable. This view is supported by the results of the present investigation, and milk powder in small doses was regarded as an inert substance and was accordingly used as an additional control.

The patient was directed to take the powders in any order and to decide in the course of a week or ten days which of them, if any, gave relief from pain. It was emphasised that he must not take a powder unless he had pain; and in the event of a powder failing to give relief he was to wait for half an hour before trying one of the others. Effects other than the action on pain were ignored. The composition of the powders was not disclosed to the patients, or to the nursing staff with the exception of the ward-sister; the powders were referred to only by colour. The group of patients was not selected except in so far as it was found necessary to abandon the investigation in a few patients who were not sufficiently intelligent to coöperate satisfactorily. No precautions were taken to prevent conversation between patients who were receiving treatment with the powders at the same time. The patients' descriptions of the effects of the powders were roughly classified as (*a*) no relief; (*b*) doubtful; (*c*) definite relief; (*d*) pronounced relief. The last two were considered to be significant. In 16 patients there was objective evidence of disease: duodenal ulcer or scarring 10; gastric ulcer 2; gastritis 1; gastric spasm 1; simple hyperchlorhydria 2. In 5 patients no signs of disease were discovered. The answers are summarised in the following table; several of the patients reported relief from more than one powder, and therefore the number of answers exceeds the number of patients.

EFFECT ON GASTRODUODENAL PAIN OF BISMUTH CARBONATE AND CONTROL POWDERS

—	Whole series	Disease proved	Disease not proved
Relief from—			
Pink powder (bism. carb.) ..	6	6	0
Blue powder (lactose) ..	8	6	2
Yellow powder (dried milk) ..	6	5	1
Unrelieved by any of powders	5	3	2

Among the 6 patients who appeared to get relief from the bismuth carbonate, 4 were also relieved by taking lactose or dried milk, and 2 experienced no relief from either of these pharmacologically inert powders. None of the patients said that the three powders gave equal relief.

Eight of the patients, after completing the course of treatment with the coloured powders, were given a similar opportunity to express an opinion on the effectiveness of a "white powder" which was magnesium oxide given in doses of gr. 6 (Mist. magnes. hydrox. ℥ 120). The object of using this substance was to determine whether the pains were amenable to treatment by a drug which is known to have a powerful antacid action. Six of these reported immediate relief from pain, and the benefit far exceeded any that had been obtained from the coloured powders. It is noteworthy that lesions of the stomach or duodenum had been demonstrated in all of these 6 patients; in the other 2 patients no disease had been

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discovered, and neither of them benefited from the magnesium hydroxide.

These results were examined statistically by Dr. Richard A. Robb of the mathematics department in the University of Glasgow, and his findings may be summarised as follows.

The effects of the inert powders (lactose and dried milk) is shown by contingency tables where the 21 patients are classified according as they have or have not disease, and according as they do or do not get relief from the powders. As is to be expected, the classifications are independent, using the χ^2 test; that is to say, these inert powders gave as much relief to patients with disease as to those with disease not proved. The same analysis when applied to the results obtained from bismuth carbonate again shows that the classifications are independent—the response of the patients was the same as when the inert powders were used.

It was found possible to distinguish between the degrees of relief obtained from the treatment, so that further analyses of the data were made. Again the figures indicate that there was no difference in the response of the patients to the three powders—bismuth carbonate, lactose and dried milk. If the 5 patients with no evidence of disease are excluded from the series and the analysis confined to those known to be suffering from gastro-duodenal disease, the results are the same.

DISCUSSION

The investigations provide no evidence in favour of the view that bismuth carbonate in therapeutic doses is a reliable means of protecting the gastric mucosa. After administration by mouth, the salt collects in the most dependent part of the stomach and there is a tendency for it to adhere to the mucous membrane in a relatively small area in the prepyloric region; but the ulcer-bearing area of the stomach is rarely affected.

Bismuth carbonate may exert an astringent action on the empty stomach, but the investigations show that even under favourable conditions this must be very slight; and in practice it must be rendered negligible by the combination of the minute amount of bismuth in solution with the mucoprotein of the gastric juice. It is clear that when a gastric astringent is required other drugs offer a much more reliable method of treatment—e.g., tannic acid in the form of glycerin of tannic acid (B.P.).

Previous workers have shown that the chemical properties of bismuth carbonate make it an unsatisfactory antacid for clinical purposes, and this conclusion is confirmed. The antacid effect following therapeutic doses of bismuth carbonate is seen to be trivial or entirely absent. Although very large doses produce appreciable changes in gastric acidity, even these are transient, and the side effects of such large quantities, especially constipation, cannot be disregarded. There seems therefore to be little justification for the view that bismuth carbonate is a valuable adjuvant to powerful antacids such as magnesia. The negative results obtained in test-meals are in keeping with the conclusions drawn from the therapeutic trials in patients suffering from gastro-duodenal disease, when it was found that bismuth carbonate was no more valuable than powdered milk or lactose in relieving pain. The findings as a whole support the view expressed by Hurst (1929): "It seems very improbable that the small dose of bismuth [carbonate] given with sodium bicarbonate in the usual alkaline mixtures, powders and tablets can exert an action of any kind in the stomach. Its use should therefore be discouraged, as it has the disadvantage of making the stools black so that the immediate recognition of slight melæna by the patient becomes impossible."

SUMMARY

The action of bismuth carbonate as an antacid was investigated in vitro, and also by fractional test-meals in healthy and ulcer subjects. Therapeutic doses were found to have only a negligible effect on gastric acidity.

Hydrochloric acid or lactic acid of the strengths found in the stomach dissolve only a trace of bismuth carbonate. Such solutions were found to have no astringent action on egg albumin.

In 12 patients who were screened after taking doses of bismuth carbonate the drug formed a pool at the most dependent part of the stomach, and showed no tendency to distribute itself over the lining of the stomach or to fill the crater of an ulcer when one was present.

Three powders consisting of bismuth carbonate, lactose and dried milk respectively were given to 21 patients complaining of abdominal pain thought to be due to abnormalities of the stomach or duodenum, and they were asked to say which powder relieved their pain. No significant difference was found in the pain-relieving effects of the three powders. Six of the patients with demonstrable disease of the stomach were then given magnesium hydroxide; all of them reported much greater relief than from any of the powders.

It is concluded that in therapeutic doses bismuth carbonate has a negligible effect as an antacid or as an astringent dressing for the gastric mucosa, and that it is of no value for the relief of pain in gastroduodenal disease.

I desire to thank Prof. Noah Morris for his interest in this work; Mr. David T. Gibson, D.Sc., of the chemistry department in the university, and Dr. W. D. C. McCrorie, assistant radiologist at Stobhill Hospital, for advice and criticism; and Sister H. D. Collins and Sister J. E. Rennie for their coöperation.

REFERENCES

Adams, W. L. (1939) *Arch. intern. Med.* **63**, 1030.
Clark, A. J. (1940) Applied Pharmacology, London, p. 314.
Cushny, A. R. (1941) Pharmacology and Therapeutics, London, p. 71.
Dilling, W. J. (1940) Materia Medica and Therapeutics, London, p. 70.
Freezer, C. R. E., Gibson, C. S. and Matthews, E. (1928) *Guy's Hosp. Rep.* **78**, 191.
Hurst, A. F. and Stewart, M. J. (1929) Gastric and Duodenal Ulcer London, p. 402.
MacKenna, R. M. B. (1931) *Lpool Med-Chir. J.* **39**, 54.
Odier, L. (1903) Manual of Practical Medicine, Geneva. (Quoted by MacKenna.)
Poulsson, E. (1940) Textbook of Pharmacology and Therapeutics, London, p. 462.
Whitla's Pharmacy, Materia Medica and Therapeutics, London, 1933, p. 315.

BLAST INJURY OF THE LUNGS

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MUCH attention has been given lately to the effects of the blast of high explosive on people in the immediate neighbourhood. Apart from its scientific interest a careful study of the subject is of great importance in deciding correct treatment, and we are therefore recording our experiences in the treatment of a series of cases of men suffering from blast injuries of varying severity.

On Nov. 18, 1940, a high-explosive bomb dropped close to a wooden hut housing a number of soldiers. The hut was demolished and almost all of the men within were affected to some extent. Of those admitted to hospital 9 were dead on arrival or died within a few minutes. The majority of these 9 had no external injury and had not been buried; no autopsy could be held on them because of pressure of work in looking after the living. A number of other men were picked up dead but were taken straight to a mortuary; they were examined by a medical officer who also reported little evidence of external injury. Of the men who survived for an appreciable time after admission, 8 were suffering from severe pulmonary blast, 2 others had severe blast injuries associated with injury to the chest wall, and 7 had lesser degrees of blast injury from which they made uninterrupted recoveries. These 17 cases form the subject of this paper.

The men were admitted within two hours of exposure to H.E. blast. The circumstances have been reconstructed with some care and there is little doubt that with two exceptions, cases 9 and 10, these men suffered from the effects of blast only. The men were billeted in wooden huts which formed part of a small pleasure fair ground. There was a bright moon with a thin layer of cloud. A sentry observed the descent of a parachute and ran to warn his sleeping comrades. He did not succeed in rousing them before the bomb struck a wooden tower close to the huts. The explosion was of such violence as seriously to shake the hospital over two miles away. The huts were completely demolished. Rescue work was begun immediately and many of the men were got out at once. Others were buried under debris which was not of a heavy character. None of the patients

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included in this paper were buried, so far as could be ascertained. Other patients, who were known to have been pinned under beams, have not been included; some of these had injuries requiring surgical treatment, but one of the striking things about this incident was the absence of severe crushed or lacerated wounds. The men were in bed on the ground floor, and the complicating factors of trauma due either to falling debris or to being blown against walls were absent except in cases 9 and 10. The circumstances of the injury comply with the criteria set up by Zuckerman (1940) in his experimental work as nearly as is likely to be found in human cases.

SEVERE CASES

CASE 1.—Severely shocked and dyspnœic; complained of great pain in chest and abdomen. Very restless in spite of morphia gr. ¼. Great diminution of air-entry with numerous coarse râles over whole chest; percussion unimpaired except at right base. Abdomen rigid and painful, and these signs dominated the picture. After resuscitation with warmth, oxygen and a plasma transfusion (½ pint) was taken to theatre and laparotomy performed. Few small subserous hæmorrhages found but no gross trauma. Patient collapsed and died on table about 4 hours after original injury.

Autopsy.—Well covered. No sign of injury except superficial abrasion about 4 in. by 2½ in. over right shin. Clean laparotomy wound. *Neck.* Carotid sheath and great vessels surrounded with partially clotted blood. No tear discovered in vessels. Thymus persistent, but appeared healthy and contained no hæmorrhages. *Thorax.* Each pleural sac contained about 2 pints fluid blood, but no ruptured vessels found. No adhesions. Hæmorrhage had occurred outside parietal pleura, most obvious along line of ribs. Irregularly shaped bright red hæmorrhages also seen beneath visceral pleura; most extensive posteriorly. Mediastinum filled with blood mostly fluid. *Trachea and main bronchi* exhibited intense congestion of mucous membrane with numerous small hæmorrhages. *Lungs* on section were bright red, resembling congestive stage of extensive early lobar pneumonia. Congestion best seen in peripheral portions, where elongated bands of dark red hæmorrhage were running parallel with pleura and about ¼ in. beneath it. Numerous small rounded hæmorrhages in other parts of lungs. On the whole, these appearances more definite in lower than upper lobes, and more in posterior than anterior portions. Nothing to suggest disease prior to injury. *Pericardium* showed no free blood, but small hæmorrhages beneath visceral layer. *Heart* healthy but contained fluid blood in all chambers. *Abdomen.* Peritoneum contained no free blood. Some small hæmorrhages beneath serous coat over cæcum and appendix and beneath peritoneum over psoas muscle on right side. Few subperitoneal hæmorrhages in left hypochondrium, and beneath serous coat of small intestine, but bowel contained no blood and showed no ulceration. Small subcapsular hæmorrhages in spleen, kidneys and liver, but these organs otherwise healthy. No lesions in suprarenals. Gall-bladder healthy; no hæmorrhages. Head of pancreas contained hæmorrhages. Bladder healthy and contained clear urine. No fractures noted. *Central nervous system.* Brain congested with some small submeningeal hæmorrhages over vertex and base. A little free blood in ventricles. No lesions in substance of brain.

Histology.—Lesions in lungs patchy. In places structure was little, if at all, altered; in others intense outpouring of erythrocytes completely obscured structure. Between these two extremes were areas, whose air-spaces were still clearly outlined with intact capillary loops, and were filled with erythrocytes. Fibrin and free blood-pigment also present in small amounts, and scattered throughout the air-spaces were numerous polymorphonuclear leucocytes and macrophages. Latter contained considerable amount of blood-pigment, and were morphologically identical with heart-failure cell seen in passive congestion. Most of capillaries bounding air-spaces contained only a few red cells; some loops contained none at all. Elastic fibres ruptured in several places. Some areas showed nothing but masses of erythrocytes with isolated fragments of ruptured elastic tissue masking alveolar structure. Many respiratory bronchioles in these areas also filled with erythrocytes and fibrin, while small bronchi mostly showed desquamation of epithelium with collections of leucocytes filling lumen. In sections of peripheral portions of lung, deep layer of pleura contained masses of erythrocytes lying between collagenous fibres; in places, this outpouring of red cells had separated pleura from lung beneath. Few streptococci seen, but no areas of bronchopneumonia.

CASE 2.—Grossly shocked, dyspnœic and cyanotic, complaining of pain in chest retrosternally and in both flanks. Rather restless. Given usual resuscitation treatment of warmth, morphia and oxygen; on account of condition not moved from resuscitation ward for sixteen hours, when temperature was 100° F. and he had recovered sufficiently to justify moving. Diminished air-entry and coarse râles all over chest, without alteration of percussion note. Radiogram (fig. I, plate) showed heavy mottling in whole left lung field and a right mid-zone. Abdomen rigid and tender. During next 12 hours was kept warm and recovered to some extent. Vomited several times coffee-ground vomitus, not examined for blood. Next day considered well enough for transfer to Chest Unit under care of Prof. R. V. Christie, to whom we are indebted for subsequent history. On arrival was restless and ill with high colour and some cyanosis; dyspnœic; drank greedily but still vomiting large amounts of thin brownish fluid which gave faintly positive guaiacum reaction. Diminished movement on left side of chest and many râles and rhonchi audible, especially in left axilla. During next few hours improved, though still irritable, dyspnœic and rather more "bubbly." Venesection attempted twice, second time successfully, with a great relief of restlessness and dyspnœa. Vomiting also ceased. Few hours later (48 hr. after incident), became restless and delirious. No râles then audible. Soon afterwards collapsed and died in spite of attempted blood-transfusion.

Autopsy. (Professor Hadfield).—No gross injury. Some hæmorrhages between parietal pleura and thoracic wall. At least two-thirds of left lung and half of right lung consolidated. Extensive dark subpleural hæmorrhages, continuous with deeply seated hæmorrhages. Consolidated parts colour of dark venous blood-clot, but "their ill-defined edges were bright red, fading off gradually into normally coloured lung. Throughout this dark coloured consolidated lung there were many scattered areas, ashen-grey in colour and sharply demarcated from the surrounding tissues."

Histology.—Appearances bore striking resemblance to those found in hæmorrhagic infarct. Little evidence of widespread alveolar rupture and Hadfield took the view that bleeding was due to diapedesis. In the grey areas each alveolus "contained a precisely staining close-marked film network in the meshes of which considerable numbers of wandering cells and partially hæmolysed red cells were lying. The general appearance bore a rather striking superficial resemblance to that of lobar pneumonia in the stage of red hepatisation." Wandering cells predominantly monocytic.

CASE 3.—Severe shock, pallor, dyspnœa and cyanosis, with great pain in chest and back. Distant breath sounds, with coarse râles all over both lung fields. Morphia and oxygen given and some degree of recovery (T. 104° F.). Next day appeared somewhat better, but still very ill (T. 102° F.). On 20th, 48 hours after injury, was again much worse. Impaired percussion note and tubular breathing at right base—i.e., clinically a lobar pneumonia. Scattered râles still audible over rest of both lungs. Radiogram (fig. II) showed heavy mottling over both lung fields with consolidation at right base. Became worse and died about 55 hours after incident.

Autopsy.—Massive hæmorrhages into substance of lung tissue on both sides, with evidence of consolidation at right base. Mediastinal and extrapleural hæmorrhages present. Unfortunately no portions of lungs preserved for section. No evidence of other injury.

CASE 4.—Shocked, though less so than previous cases; some dyspnœa and cyanosis. Diminished air-entry at both bases and scattered râles over both lung fields. Percussion note normal. Complained of some pains in chest and abdomen, but these grew less severe after a time (T. 101·2° F.) Next day much better. Still diminished air-entry at lung bases and scattered crepitations over whole of both lungs. Radiogram (fig. III) showed heavy mottling in left lung, less in right. Transferred to care of Professor Christie who has provided subsequent history. On arrival no dyspnœa or cyanosis. Nothing abnormal heard on auscultation anteriorly. Nov. 21: bruising of right chest wall; diminished movement on left; pulmonary second sounds (P 2) accentuated; B.P. 140/88 mm. Hg. Nov. 23: vital capacity 2500 c.cm. Dec. 2: vital capacity 3800 c.cm.; X ray clear; P. 2 less accentuated. Dec. 9: P 2 more accentuated; ½ oz. bright blood coughed up; X ray normal; no abnormal physical signs. Dec. 15: coughed up dark red blood; P 2 still very loud. Jan. 5, 1941: bright red blood intimately mixed with mucus coughed up; P 2 + +.

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The cause of the recurrent hæmorrhages and their relation to the accentuated pulmonary second sound are obscure.

CASE 5.—Severe shock; complained of pain in chest. Dyspnœa but no gross cyanosis. Highly resonant percussion note and much diminished air-entry at left base. Elsewhere percussion note normal. Scattered râles over rest of both lung fields. Pneumothorax on left side diagnosed and confirmed radiologically (fig. IV). Next day breath sounds at left base tubular paravertebrally and absent in axillary line. Few crepitations still audible elsewhere, notably at right base.

Very gradual improvement in physical signs until on Jan. 7, 1941, chest appeared normal. General condition improved rapidly after first few days and patient made no complaints.

CASE 6.—Moderately severe shock; considerable dyspnœa and cyanosis. Complained of pain in chest and within an hour had brisk hæmoptysis of 5 oz. which relieved his pain. Rhonchi all over chest and was wheezing like an asthmatic. It was thought that condition might be due to inhaled dust, but no evidence of this either then or later. Resuscitation by oxygen and warmth; T. 99·6° F. Next morning much better; still cyanosed but breathing more easily. Radiogram (fig. V) showed characteristic mottling in both lungs. Still rather wheezy. By evening, 36 hours after the incident, temperature 101° F.; clinical signs of consolidation at left base. Nov. 20: signs of consolidation at left base more definite and some râles audible; right base also congested; rhonchi over rest of lung fields had diminished; T. 104° F.; dyspnœic, cyanosed and delirious. Nov. 21: general condition much improved; left base still consolidated and crepitations audible at right base; T. 101° F. Nov. 22: very much improved; left base clearing; basal crepitations on both sides; still a little wheezy.

Thereafter the patient made a good recovery though air-entry remained weak at the bases for several weeks. The final radiogram showed complete resolution.

CASE 7.—Severe shock, pallor, cyanosis and dyspnœa. Complained of pain in chest and abdomen. Resuscitation measures: warmth and oxygen and plasma transfusion. Air-entry poor and râles present all over both lungs. Most striking clinical feature was completely rigid and painful abdomen. Laparotomy decided on; nothing found except few small subserous hæmorrhages; abdomen closed. Nov. 19: air-entry into right base diminished and percussion note impaired; spitting up small quantities of dark blood; T. 104° F., P. 142; later in day tubular breathing became audible at right base. Nov. 20: very ill; right base dull to percussion and tubular breathing still a feature; T. 105° F.; complained of diplopia and had a convulsive movement of frontalis muscle, apparently a tic. Nov. 21: dull in right axilla and base; breath sounds weak with some râles: few rhonchi at the left base, where breath-sounds also weak. Nov. 22: signs as before; radiogram (fig. VI) shows collapse of right lower lobe; T. 102° F. Nov. 28: general improvement; breath-sounds still weak in right axilla and at base; tic still present; diplopia remains, but only on lateral deviation of more than 45°; no obvious weakness of oculomotor muscles. Nov. 29: T. 103° F., abdominal wound slightly septic; tubular breathing at right base with some râles; breath-sounds weak in axilla, normal over middle lobe; mucopurulent sputum. Thereafter patient made gradual recovery with re-expansion of the collapsed lobe.

The diplopia is difficult to explain. It may have been due to a cerebral contusion. Eventually it disappeared completely.

CASE 8.—Some shock, bruising and pain in chest, particularly on right. Breath-sounds weak at both bases; no added sounds. Nov. 21: some cough and pain; mucopurulent sputum; no blood; no dyspnœa. Nov. 23: still coughing; mucopurulent sputum; no added sounds. Some pain. X ray showed no abnormality. Nov. 27: pain in region of right base and axilla; breath-sounds weak, percussion note normal; no added sounds; pain in side on deep breathing; T. up to 100° F. and has not settled since. Nov. 24: general malaise; pain on breathing; no definite signs except weak breath-sounds at right base. Nov. 29: no change; T. 102° F. Nov. 30: T. 101° F.; pain in chest still; impaired note at right base with weak tubular breathing and few râles; sputum purulent. Dec. 1: much improved; less pain; breath-sounds very weak; no added sounds. Thereafter there was gradual resolution, still incomplete 6 weeks later.

CASES WITH DAMAGE TO CHEST WALL

Both cases 9 and 10 had injuries to the chest wall. Their clinical appearance, however, was that of blast injury to the lungs. Case 9 had all the characteristics of severe pulmonary injury and damage to the chest wall was discovered only at autopsy.

CASE 9.—Severe shock, dyspnœa and cyanosis. Pain retrosternally and on both sides of chest, particularly on deep breathing. Complained continually of severe pain in abdomen. Normal percussion note with poor air-entry all over chest, particularly at bases. Coarse râles all over both lungs. Abdomen rigid and tender; no shifting dullness. After resuscitation improved slightly but remained dyspnœic and cyanosed. Pulse rapid and of poor volume. Patient died 14 hours after explosion.

Autopsy.—Well covered. No external evidence of injury. Simple transverse fracture of sternum and fracture of pelvis. Massive hæmorrhages in posterior mediastinum in loose tissue behind and around great vessels; apparently due to rupture of small veins, for no damage to large vessels could be detected. Hæmorrhages also found in extrapleural tissues of intercostal spaces, so that inside of thorax appeared black between white bands of ribs. No evidence of visceral injury in abdomen. Gross hæmorrhages in psoas sheaths on both sides. Visceral pleuræ showed large irregular blotches of dark red hæmorrhage and areas of ecchymoses. Lungs much congested with here and there large irregular hæmorrhages similar to those in pleura. Standing out clearly by contrast on congested background were many pin-point yellowish-white areas of early bronchopneumonia. Right apex and anterior free border of lung emphysematous; at base of lower lobe on this side was small collection of dilated bronchi suggesting developmental bronchiectasis, unrelated to injury. Sections of bronchial wall showed intense infiltration of mucosa and submucosal layers with blood-corpuscles and blood-pigment. Histological appearances resembled those of case 1, but rupture of elastic fibres less definite. Numerous areas of very early bronchopneumonia, containing short chains of streptococci.

CASE 10.—Moderate shock. Complained of pain in chest especially on right. Breath-sounds weak all over but especially at right base. Crepitus audible and palpable; diagnosis of fractured ribs made. Radiologically 8th and 9th right ribs seen to be fractured; small hæmothorax. Areas of mottling in both zones. Pain and poor air-entry continued for some days but patient made uninterrupted recovery. X-ray appearances cleared up in a few days.

SLIGHT CASES

The remaining cases are not recorded in detail, since on account of pressure of work no other investigations were carried out. They are none the less to be considered as mild cases of blast injury.

CASES 11–17.—These 7 men were obviously less ill than any of foregoing. Came in somewhat shocked and dyspnœic, with some cyanosis and pain in chest and back. Breath-sounds distant; no added sounds. Percussion note normal. Symptoms disappeared in a few days and recovery was smooth.

CLINICAL FEATURES

The features of the cases which impressed the clinical observer were as follows.

Shock was profound in the 5 more serious cases. Blood-pressures were not taken, but pallor, cyanosis, and rapidity and poor volume of the pulse were noted. The other 5 patients described in detail were severely shocked, though less so than the foregoing. The remaining cases were definitely though not dangerously shocked.

Dyspnœa was a constant feature of all the patients. The difficulty of respiration was due in part to pain and in part to extreme bulging of the chest, which appeared to be in the position of almost full inspiration. This bulging has also been noted by Dean, Thomas and Allison (1940). Dyspnœa continued till death in fatal cases; it remitted to some extent after 24 hours in cases 5, 6 and 7, and became noticeable again as the signs of pneumonia developed; in cases 4 and 8 it disappeared within 24 hours.

Cyanosis was obvious in the most severe cases and present in all the others. In cases 1, 2, 3 and 9 it remained till death. In cases 5, 6 and 7 it disappeared within 24 hours. Thereafter the picture was confused by the administration of sulphapyridine. The other cases had cyanosis on admission but lost it after 24 hours.

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Pain in the chest.—Great pain was complained of by cases 2, 3 and 9, all of whom died. The pain was of two distinguishable types—a central deep constant pain which was especially severe in cases 2 and 9 and a less severe pain felt more laterally and made worse by deep breathing. The other patients complained of pain of both types, but it was noticeable that the less severely injured made little complaint of the central pain while complaining that the lateral pain was preventing them from breathing. The central pain disappeared in the recovering cases after a few days, while the other pain remained for at least a week. The cause of the pain in the chest is not clear. The deep central pain may be related to the mediastinal hæmorrhages. The innervation of the loose tissues of the mediastinum does not seem to have been well worked out, nor is it clear what is the effective pain stimulus. The pain felt in the sides may have been due to contusion of the intercostal muscles, since at autopsy hæmorrhages into the spaces extrapleurally was a constant finding. These hæmorrhages may also account for the bulging of the chest wall. Contusion of the muscle might well result in spasm and contraction of the intercostal muscles causing the chest to assume the inspiratory position.

Pain in the abdomen was an important feature of this series. This was particularly striking in cases 1, 2, 3, 7 and 9. Cases 1 and 7 presented the appearance of acute abdominal disaster, having great pain and tenderness and rigid abdominal walls. It was decided that laparotomy was necessary but nothing abnormal was found except a few small subserous hæmorrhages. The abdomens were closed at once. Case 1 died on the operating table. It was then decided that the other cases who were not less like acute abdomens should be left. Case 2 vomited at intervals during the first 24 hours, at times bringing up a brown vomit. He was transferred to the care of Professor Christie, who noted the condition but decided to await events. Cases 3 and 9 retained their abdominal tenderness and rigidity till death, but the signs ceased to dominate the clinical picture as they had done in the early stages. Autopsies were carried out on cases 1, 2, 3 and 9. In each of these hæmorrhages were found extrapleurally when the viscera were removed from the thorax, the intercostal spaces appearing black in contrast to the white bands of the ribs. It seems possible that these hæmorrhages caused irritation of the intercostal nerves with consequent rigidity of the abdominal wall. Zuckerman (1940) reports that this finding is also present in some experimental animals and finds the hæmorrhages continuous with those in the sheaths of the intercostal nerves. He agrees that this may be the cause of the abdominal signs. Another possible cause of the rigidity is that the abdominal muscles have themselves been damaged. No investigation of this point was made. Stress is laid on the clinical findings pointing to acute abdominal injury because of the logical course of treatment which they suggest. The two laparotomies were undertaken in men whose lungs were known to be damaged and the negative findings were an unpleasant surprise. At autopsy in case 1 lesions were found which made it unlikely that he would have lived. Case 7 survived after a stormy period.

Hæmoptysis.—Free hæmoptysis was observed in cases 4 and 6. The amounts of blood were about 4–5 oz. Both men were seriously affected by the blast, but neither at any time gave cause for grave anxiety. Both men were undisturbed mentally by the hæmoptysis and both seemed somewhat easier after it. The blood was noticed about an hour after the blasting and the duration of the free hæmoptysis was about 15 min. Thereafter only small amounts of stained sputum were brought up. Case 1 was noticed to have brightly stained froth in his air-passages while under the anæsthetic for his laparotomy. Case 7 brought up a little dark-stained sputum during the day after the incident. A few of the other men brought up dark blood in the sputum after 24–48 hours, but no other cases had free hæmoptysis. Some of the men brought in dead or dying had blood staining in the nose and mouth without visible injury. This accords with the more detailed observations made by Hadfield in his autopsies. Other men who were operated on for lacerations and other injuries and are not included here were found to have blood-stained secretion in the trachea. These patients were certainly suffering from blast. Apart, however, from the 2 cases mentioned hæmoptysis was not a prominent symptom.

Cough and sputum.—None of the men were noticed to be coughing during the first twenty-four hours after blasting. After this a number had coughs, some of which were troublesome. The sputum was moderately thick, muco-purulent, and in several cases stained with dark blood for 24–48 hours. In uncomplicated cases, the cough and sputum disappeared in ten days; they persisted in the cases with severe late effects or complications.

Restlessness was extreme in some cases. Case 1 was quite uncontrollable even after repeated doses of morphia. At autopsy some subarachnoid hæmorrhage was present in the vertical region. There was no evidence of cranial injury. Case 2 was restless during the first few hours but gradually became quieter. After transfer to the Chest Unit he was again restless and continued so most of the time until his death. Case 3 was exceedingly restless and controlled only by repeated doses of morphia. Case 9, although in severe pain, was less restless than the foregoing. He too had some subarachnoid hæmorrhage without obvious cranial injury. The other cases were restless in proportion to the degree of injury but they were all controlled by morphia.

Restlessness is therefore a constant symptom of blast injury and bears a direct relation to the severity of the damage. The pathological findings suggest that it is not due to the pain but rather to an irritative lesion within the cranium. This is supported by the observation that other victims of this incident whose principal injuries were caused by violence (e.g., falling debris) were restless out of all proportion to the severity of their injuries. The most extreme case was that of a man with a fractured femur who was almost maniacal for a week after the injury. There was no gross evidence of cranial injury or pulmonary damage and the femur was successfully reduced a few jours after injury. Certain other men with cranial and facial injuries gave no special trouble and one lad with extensive and painful burns was kept quiet without difficulty. It seems justifiable to conclude that extreme restlessness is a result of blast injury to the head.

Ruptured ear-drums were found in 25 men. Some of these developed purulent otorrhœa which in a few cases proved very resistant to treatment.

PHYSICAL AND RADIOLOGICAL SIGNS

The physical signs in the chest varied with the severity of the condition, but some were common to all patients in this series. The chest was held about three-quarters expanded. Respiratory movement was, therefore, much reduced, but was generally equal on the two sides. Attempts at deep inspiration were limited by the expansion of the chest and the fact that the movement was painful. Palpation gave no additional information. The percussion note was resonant at all areas in the early stages. On auscultation, the breath-sounds were notably weak especially at the bases. Coarse râles were audible over the whole of the lung fields, numerous in the fatal cases 1, 2, 3 and 9 and less numerous in the other severe cases 4, 5 and 7. Case 6 was peculiar in that the added sounds were rhonchi. The man was wheezing like an elderly bronchitic, though he had had no bronchitis previously. The less severe cases, 8 and 10–17 inclusive, had no added sounds. The râles persisted until death in cases 2, 3 and 9, where observations were made, though they became less numerous in the period of partial recovery which each patient showed. Case 1 died without further observation on this point. In cases 4, 5 and 7 the generalised râles became less numerous and disappeared in the course of a few days. They appeared to persist longest at the lung bases.

A striking feature was the development of the clinical appearance of lobar pneumonia at one lung base. This was heralded by a more or less sharp rise of temperature. Case 3 had a temperature of 104° F. 12 hours after the blast. After 48 hours the percussion note at the left base was much impaired with tubular breathing; this clinical finding was confirmed by X ray; he died a few hours later. Case 5 showed a similar condition at the left base paravertebrally 30 hours after the blast, though here the picture was complicated by a small clinically

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and radiologically demonstrable pneumothorax. Case 6 developed pneumonia at the left base 36 hours after the blast. He had a temperature of 101° rising to 104° F. and had some hours of delirium. Case 7 had clinical signs of pneumonia 24 hours after the blast. This was confirmed radiologically, though it was shown shortly afterwards that he had collapse of the right lower lobe. Case 8 was peculiar in that his lungs were clear for 8 days after the explosion, though he had some pain, cough with sputum and an irregular temperature. He then complained of sharp pain in his right side, worse on inspiration, and after a further 36 hours had typical clinical and radiological pneumonia of the right lower lobe. All the cases were treated with sulphapyridine and the duration of the pneumonia was short, with the exception of case 7 who was seriously ill for some days. Pathological examination of case 9 showed, however, that the inflammatory condition was a bronchopneumonia. The correct explanation seems to be that the physical signs are largely due to the effusion of blood which corresponds roughly to the stage of red hepatisation of lobar pneumonia and may be expected to give rise to the same physical signs.

The less severely blasted cases 11–17 showed no definite physical signs except the bulging of the chest wall with its associated limitation of movement and respiratory excursion. The condition became normal in 7–10 days.

Radiograms of the chest were taken within 72 hours in cases 2, 3, 4, 5, 6, 7 and 10. Cases 1 and 9 were too ill to disturb. The severe cases 2, 3 and 4 all show similar pictures (figs. I, II and III). There is heavy mottling over large areas of the lung fields. In case 2 it extends through the whole of the left lung field. The right middle lobe is seriously affected and to a lesser extent the upper and lower lobes. The picture reproduced in fig. I was taken within 12 hours of injury.

The radiogram of case 3, taken about 48 hours after the injury (fig. II) shows the mottling scattered through both lung fields. The dense shadow seen at the right base corresponds with an area of pseudo-pneumonic consolidation which was evident clinically and was found at autopsy.

Case 4 was X rayed about 30 hours after injury. Fig. III shows the mottling scattered throughout the left lung and less densely through the right lung. Next day the condition had cleared considerably except at the left base, where the shadowing was denser and more homogeneous. Five days later the lung had largely cleared and subsequent radiograms showed no abnormality. This heavy mottling must be taken as the characteristic radiological appearance after severe blast injury. It is due to the interstitial and alveolar hæmorrhage and varies in density and extent with the clinical and pathological findings. In severe non-fatal cases it clears rapidly pari-passu with the clinical signs, translucency of the lung being normal within 7 days. A rather less severe case (case 6) shows similar mottling of both lung fields 24 hours after injury (fig. V). These were still present four days after injury when the radiological appearances of a right basal pneumonia confirmed the physical signs; 10 days after the injury the mottling had disappeared though the lung striation was rather heavy.

Case 5 showed a small spontaneous pneumothorax at the left base together with some mottling in the left mid-zone (fig. IV). Both cleared up in the course of a few days.

A radiogram of case 7 taken about 54 hours after blasting showed heavy mottling in the left mid-zone and collapse and consolidation of the right lower lobe (fig. VI). After treatment the mottling cleared up in the course of 10 days while the collapsed lobe gradually re-expanded completely.

Case 8 had no radiological lesions when first X rayed a week after the explosion; 4 days later he had some consolidation at the right base which resolved very slowly. Case 10 showed similar mottling in the early stages, but cleared rapidly.

PATHOLOGICAL FINDINGS

The most striking feature in the autopsies was the effusion of blood. This varied from capillary oozing to large hæmorrhages, in one case filling both pleural sacs and the tissues of the neck around the carotid sheath. For the most part this blood remained fluid.

Histologically the chief characteristics were (*a*) an extensive outpouring of erythrocytes, in places accompanied by fibrin formation and the accumulation of blood pigment, though these were not constant; (*b*) rupture of elastic tissue and capillaries in the most affected parts; and (*c*) secondary infection with streptococci and bronchopneumonia. The function of the lungs must obviously have been impaired by the filling of respiratory bronchioles and air-spaces of large areas with blood, and by the rupture of the elastic tissue and capillaries. If the initial period of shock could have been overcome, the blood corpuscles would presumably have been removed from the air-spaces by the tissue defences as they are in pneumonia, but ruptured elastic fibres and capillaries would not be likely to undergo repair. Blast lung, therefore, may suffer both a temporary and permanent impairment of function, varying with the extent of the initial hæmorrhages.

The presence of streptococci and bronchopneumonia is noteworthy. Probably very few lungs are completely free from organisms even in health, and the risk of secondary infection in blast lung is not negligible.

These investigations were made before Robb-Smith's paper (1941) on fat-embolism was published. Subsequent investigation of the material with frozen sections did not show any emboli. No pictures of the post-mortem specimens or slides can be reproduced owing to the destruction by enemy action of all the pathological material with the exception of one rather unsatisfactory specimen.

TREATMENT

Shock.—All cases of shock were treated by standard resuscitation methods—heat and morphia. Heat was applied to the most serious cases by means of electric cradles, to others by hot bottles. Morphia was given to control restlessness. The initial dosage was gr. $\frac{1}{3}$. This kept the majority of cases fairly quiet. Cases 1 and 2 however were violently restless and complained of very great pain, and further doses of morphia gr. $\frac{1}{4}$ had to be given. It has been argued that morphia in shock has its dangers, particularly when there is damage to the lungs. It seems likely, however, that the restlessness and distress of the patient are far more dangerous, and morphia is the only drug which will control them.

Oxygen.—Cases 2, 3, 4, 5, 6, 7 and 9 were given continuous oxygen. Nasal catheters and spectacles were used as B.L.B. mask were not supplied until later. Some difficulties were experienced on account of the restlessness of the patients, but the relief afforded by oxygen was obvious. Later, when B.L.B. masks were available, they were used, particularly in the treatment of the pneumonias.

Transfusions were given to cases 1, 2, 3, 7 and 9. The transfusion fluid was plasma for cases 1, 2 and 3, and blood for case 9, while case 7 received both plasma and blood. None of the patients received more than 2 pints and the immediate transfusion of large quantities of plasma as recommended by Whitby and his co-workers (1941) was not undertaken. It seems doubtful whether blood should be given unless there is concomitant hæmorrhage. Christie observed that there was dilatation of the veins of the neck in one of the cases transferred to him (case 2). This man was much relieved both of his restlessness and the congestion of his lungs by venesection. Christie further noted that prior to venesection, the hæmoglobin was 125%. The indication is for plasma and not blood. These conclusions are confirmed by the pathological findings. It is difficult to see how a lung containing large areas of effused blood, often with rupture of the elastic tissue and capillaries, can benefit by blood-transfusion.

Sulphapyridine was given prophylactically to cases 3, 5, 6 and 7. The dose was two tablets 4-hourly. Case 8 received three tablets followed by one tablet 4-hourly. This dosage appeared to have no effect in preventing the development of pneumonia. When the pneumonia developed the dosage was increased to two tablets 3-hourly. The temperature dropped to normal within 48 hours in cases 5 and 6. Case 7 had pyrexia lasting 6 days and settled down gradually. Case 8 was treated for 48 hours, and then, as the temperature had more or less settled, the sulphapyridine was stopped; it was started again when he developed signs of pneumonia 9 days later.

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DIAGNOSIS

The diagnosis of blast injury of the lung is not difficult in the most severe cases. Gross shock, out of proportion to the degree of injury, pain in the chest, restlessness, dyspnœa and cyanosis are the main symptoms. Blood-stained sputum or free hæmoptysis may be present. Bulging of the chest wall, poor respiratory excursion, normal percussion note with perhaps impairment in one locality, distant breath-sounds in all zones and numerous coarse râles or sometimes rhonchi are the main physical signs. In milder cases the degree of the symptoms is less, and restlessness and cyanosis may be absent. The physical signs are similarly less prominent and added sounds are few or absent. X-ray appearances are characteristic. They resemble in some measure a patchy pneumonic consolidation to which they are histologically very similar. In favourable cases resolution is very rapid, the lung clearing in 4–7 days.

The principal difficulties arise in cases where there are gross other injuries, particularly injuries to the chest wall. Fractures of the sternum and ribs may confuse the picture. Hæmothorax gives a similar picture to blast injury but produces dullness on percussion. Pneumothorax similarly may give rise to difficulty, but the hyper-resonant percussion note will point to the diagnosis. Hæmothorax and pneumothorax may both be due to blast injury. Most blast injuries occur in cases which have also contusions or crush injuries of the chest. Osborn (1941) contends that since they are so often found together they should be described together. But since blast injuries and crush injuries can be studied separately in animals it seems desirable that they should be kept separate as far as possible in human material also, at least until it can be shown that the pathology and treatment are the same.

No confirmation is supplied by this series of cases of Osborn's view that blast injury is best marked in the phrenico-costal sinus. The severe cases had contusions in the deep parts of the lungs and at the edges. The less severe cases had lesions in the thicker parts of the lungs, and showed no lesions in the sinuses. With regard to Osborn's "attempt to show that the same lesion may result from a sudden diffuse compression by bombs and mechanical means," it is perhaps a little premature to regard the distinction as only academic.

The importance of making a diagnosis of blast injury is great, since rest is of prime importance, and anæsthetics are contra-indicated.

SUMMARY

Eight severe cases of blast injury to the lungs without external injury and 2 associated with injury to the chest wall are described in detail; seven less severe cases are also recorded. The main symptoms were grave shock, prostration and restlessness, respiratory difficulty and pain in the chest. The principal physical signs were bulging of the chest wall, congestion and consolidation of the lungs. Bronchopneumonia was a common sequel. The radiological appearances are characteristic. The treatment consists of heat, morphia, oxygen and plasma-transfusion. Blood is only indicated if there is anæmia. Chemotherapy should be started as soon as the patient has recovered a little.

Five cases showed severe abdominal signs, and two were explored. Operation is contra-indicated unless the signs point to a specific lesion. A general anæsthetic should be postponed as long as possible. The patients should not be moved more than is absolutely necessary.

Pathologically, there was gross effusion of blood into the mediastinum due to rupture of capillaries. Naked eye, the lungs exhibited patches of intense congestion resembling early lobar pneumonia. Histologically, there was (*a*) extensive outpouring of erythrocytes, (*b*) rupture of elastic tissue and capillaries, and (*c*) secondary infection with streptococci causing bronchopneumonia. No evidence of fat-embolism was seen.

We are indebted to Dr. W. A. Bullough, county medical officer, for permission to publish these cases.

REFERENCES

Dean, D. M., Thomas, A. R. and Allison, R. S. (1940) *Lancet*, **2**, 224.
Hadfield, G. and Christie, R. V. (1941) *Brit. med. J.* **1**, 77.
Kekwick, A., Marriott, H. L., Maycock, W. d'A. and Whitby, L. E. H. (1941) *Lancet*, **1**, 99.
Osborn, G. R. (1941) *Brit. med. J.* **1**, 506.
Robb-Smith, A. H. T. (1941) *Lancet*, **1**, 135.
Zuckerman, S. (1940) *Ibid*, **2**, 219.

Reviews of Books

Bone Graft Surgery in Disease, Injury and Deformity

FRED H. ALBEE, M.D., F.A.C.S., president of the International College of Surgeons. London: D. Appleton Century Co. Pp. 403. 35*s*.

THE wide use which is now made of the bone graft in the surgery of disease, injury and deformity is so much taken for granted that one is apt to forget the debt owing to Albee for his pioneer work. Albee's name is associated with a fusion operation for spinal tuberculosis, and he still claims that this method of treatment supplants conservative measures, a view which has never been shared by British surgeons who find the chief value of the bone graft rather in the prevention and treatment of ununited fractures and in the ankylosis of joints. In this book Albee makes it clear that the success of any graft depends on the perfection of its fit. Inaccuracy spells failure. The ingenuity with which he has devised means of accurately fitting grafts deserves the highest praise and to the young surgeon who wishes to learn bone grafting surgery this book is indispensable. The author has drawn on a lifetime of experience and the methods described cover the widest range. As an account of the technique of bone graft surgery the book is supreme. It is attractively written and well illustrated.

Medical Diseases of War

(2nd ed.) Sir ARTHUR HURST, D.M., F.R.C.P. London: Edward Arnold and Co. Pp. 427. 18*s*.

THE experience gained in this war since the first edition in January, 1940, has increased this volume by 100 pages. Additions include: a full account of meningococcal fever, with the importance of the non-meningitic type stressed; a clear and well-illustrated section on malaria; an addition to the skin section on impetigo; the return of the chapter on amœbic dysentery from the parent volume of 1918; and a review of the "gastric" situation, probably the most important medical problem of this war. This is the only existing book on the purely medical aspects of war, and the appearance of a new edition to cover the altered situation is welcome. It is to be hoped that future editions will continue to cater for new aspects with further inclusions, even if some omissions have to be made to keep the work of serviceable compactness. For example, shock, resuscitation methods and blast injuries might displace subjects which have not been prominent in this war, such as trench fever and the dramatic type of hysteria. We would be sorry to see these last pages go on account of their interest and originality, but economy and price are important points in such a book, which has been invaluable in past war years and should continue to be so.

The Medico-Legal Post-Mortem in India

(2nd ed.) D. P. LAMBERT, M.D., D.T.M. & H., major, I.M.S. London: J. and A. Churchill. Pp. 113. 5*s*.

THE previous edition of this little book has evidently achieved the end which the author had in view when it was written, for a second edition now appears with but the slightest alteration in the general matter or arrangement of the text. We previously remarked on the value of Major Lambert's personal observations on the practical aspects of his subject. The book remains an excellent aid to the performance of medicolegal autopsies in India.

Plant Science Formulæ

R. C. MCLEAN, D.Sc. Camb., F.L.S., professor of botany, University College, Cardiff; and W. R. IVIMEY COOK, Ph.D. Lond., F.L.S., lecturer in the department. London: Macmillan and Co. Pp. 203. 7*s*. 6*d*.

THIS is, as stated in the subtitle, a reference book intended for the use of plant science laboratories, including bacteriology. It contains a collection of formulæ which the authors have selected on the basis of their experience and that of others as of proved value. In addition to those concerned with the fixing, preservation and staining of material, formulæ for the preparation of the more customary reagents, nutrient media, photographic requirements and other laboratory needs are included. Whilst there will naturally be diversity of opinion as to what ought to be included or omitted from such a selection the work should prove a useful addition to the laboratory bookshelf.

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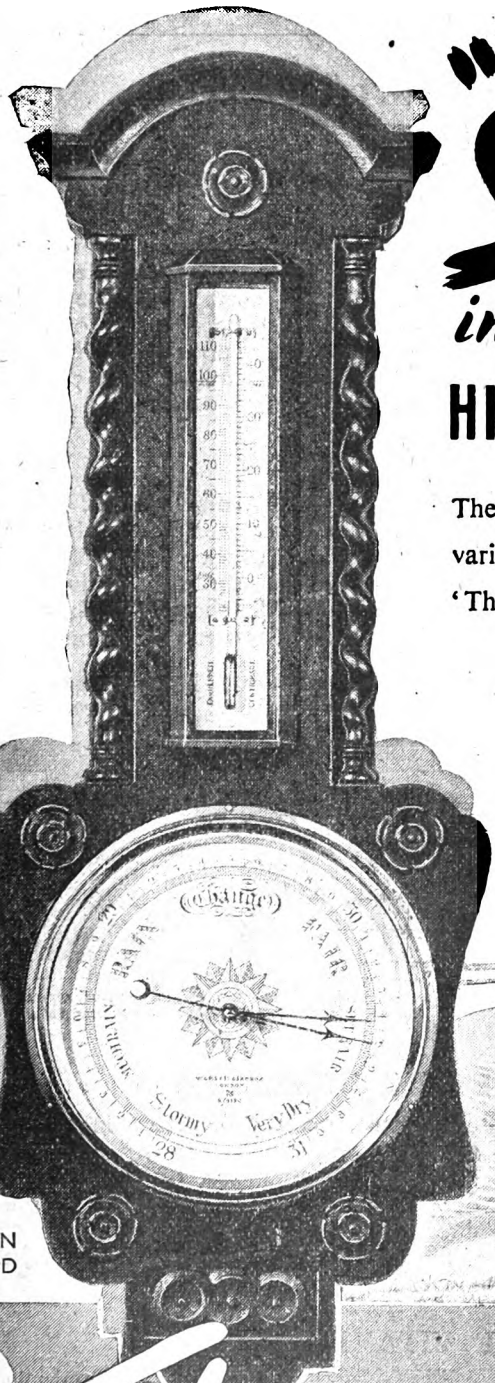

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WINTER INFECTIONS

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EFFECTS OF MILK LIMITATION

There are good grounds for believing that dental caries is one of the results of the dietary deficiencies so prevalent to-day. Apart from the influence of bad teeth upon the digestion and general health, their carious condition is a sign to the physician that faulty diet has played at least a part in the production of the patient's other symptoms.

In support of this belief may be quoted, amongst other findings, the recently-published results of an investigation in the Island of Lewis in the Outer Hebrides, where 28 per cent. of the country children were found to be entirely free from caries, compared with 1.9 per cent. of children in London, and "all the positive indications support the view that only differences in diet can explain the facts."

The physician is only too well aware of the prevalence of dental disease, particularly among lower-paid workers; and it is interesting to note that a very recent examination of 1,352 male workers revealed that only 25 were free from dental disease (*Lancet*, 1941, 1, 51).

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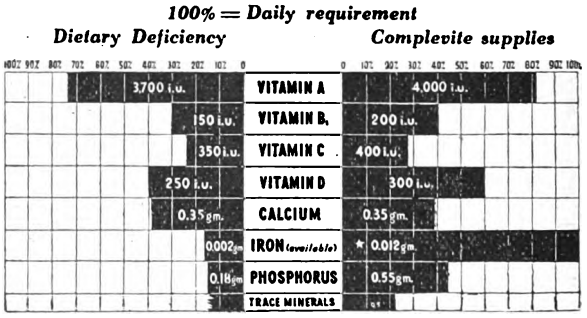

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THE LANCET

LONDON: SATURDAY, OCTOBER 11, 1941

BIPP AND ITS FRIENDS

TOWARDS the end of 1915 RUTHERFORD MORISON [1] first introduced bipp cream, consisting of one part of bismuth subnitrate and two parts of iodoform made into a paste with liquid paraffin, for the treatment of war wounds. At the time he was stationed in England, and most of his cases being late he merely enlarged the wound or abscess cavity and after complete hæmostasis dried the cavity with spirit and applied a small quantity of this paste to the walls. He then sutured the wound. He was astonishingly successful although, as he admitted, he had acted contrary to the canons of surgical teaching. A little more than a year later intermittent irrigation with Dakin's solution, as introduced by CARREL, became the popular method of wound treatment. To keep the wound under observation and see the pus washed away made a strong appeal, and, as THOMAS once wrote of other things, it is difficult to cure that "hankering to interfere." But bipp continued to be used by many surgeons although its effectiveness remained a puzzle. The bacteriologists have pointed out that in broth streptococci can actually be grown on the paste. MORISON was of course aware of this and he repeatedly referred to the fact that the wound discharges contained numerous organisms. A full bacteriological investigation of bipped wounds by CHAMBERS and GOLDSMITH [2] at that time showed that aerobic and anaerobic organisms could invariably be recovered but that there was no free proliferation. Yet these wounds healed as if they were surgically clean—there was no redness, no induration, and the granulations were vascular and firm. Similar observations on the healing of wounds despite a multiplicity of apparently virulent organisms have been made in this war by ORR-EWING, SCOTT and GARDINER,[3] in their bacteriological investigations on wounds treated in plaster.

Lately GURD and MCKIM [4] have recorded their successful experiences in the use of bipp for 25 years. They explain its action on a physical basis rather than from any special antiseptic rôle of iodoform or liberated iodine. They describe it as "curtain drainage." If on a smooth surface such as glass water is poured it will fill the area and stay. But if oil is poured on the glass first, water then applied will immediately float off. Thus on the walls of the abscess cavity or incised wound oiled with bipp the lymph will not adhere and clot but will continue to flow and there will be a continuous discharge of fresh leucocytes and antibacterial products. It is like the paraffined syringe of old for blood-transfusion, where the blood would flow without clotting. MORISON and others who use bipp have all commented on the free flow of leucocytic discharge. This lymph lavage—a "lymph leech" to prevent any stanching of the lymph outflow—was ALMROTH WRIGHT'S [5] concept of the physiological approach required for wound treatment. The drying of the wound with spirit, the use of only a small quantity of bipp to coat the walls (MORISON recommended that no more than two drachms should be used)—these are the rules that must be observed. GURD and MCKIM do not agree with the principle of wound suture. They make certain by further incisions that the wound tissues are relaxed—especially the fasciæ—and after being lined with bipp the cavity is firmly packed with gauze soaked in liquid paraffin and containing a little more bipp. If it is a limb that is wounded it is either splinted or encased in plaster. A remarkable feature has been the absence of sinuses and the rarity of sequestrum formation in the compound fractures. SAINT [6] has also remarked that little or no sequestration followed in his cases of osteitis thus treated. DOUBLEDAY [7] has recently advocated the use of bipp in injuries and abscesses of the jaw. In this war there has as yet been no report on the late results of the closed-plaster treatment of compound fractures, but when closed plaster was used in Spain D'HARCOURT [8] and others reported that sinuses and sequestra were definite late problems which still required an answer.

There has always been one bogy dangling before the users of bipp—poisoning. Tachycardia, delirium or mental aberration, emaciation and signs of bismuth metallism, such as gingivitis, stomatitis and diarrhœa, have been the main symptoms recorded in cases where bipp poisoning was suspected. Neither MORISON nor GURD and MCKIM, out of thousands of cases, had any deaths that could possibly be attributed to it. It was the misuse of bipp that was responsible for the rare intoxication. The latter record seeing knee-joints packed with bipp, and an empyema cavity filled with 6 ounces of the paste. With bipp properly used the danger of poisoning is remote, but most surgeons urge special care in children. The poisoning symptoms seem nearly always to be due to the bismuth, and gingivitis or stomatitis long precedes any others. Washing out the wound with hydrogen peroxide and giving alkalis, GORDON WATSON [9] points out, ensures an ample margin of safety. Ten years ago CONNELL and BUCHANAN substituted zinc oxide for the bismuth subnitrate and CONNELL [10] claims that in his "zipp" the action of bipp has been retained with no risk of toxic symptoms. He has employed zipp extensively in the tropics and finds that the problems of maggots and smell in wounds treated in plaster are thus overcome. When wounds are plugged with soft paraffin maggots will almost certainly appear in abundance inside the plaster, and although they do no harm (and even good) yet patients justifiably protest. Zipp is now being employed in East Africa and further reports will be of special interest. HOFFMAN [11] has gone further and sought to add an antiseptic punch to the paste by substituting zinc peroxide for bismuth and adding sulphanilamide powder. This he calls "zisp." He claims that zinc peroxide liberates oxygen and thus deals with the

1. Oxford War Primers, London, 1918; *Brit. J. Surg.* 1917, **4**, 659.
2. Chambers, H. and Goldsmith, J. A. *Lancet*, 1917, **1**, 331.
3. Orr-Ewing, J., Scott, J. C. and Gardiner, A. D. *Brit. med. J.* 1941, **1**, 878.
4. Gurd, F. B. and McKim, L. H. *Amer. J. Surg.* 1941, **3** 573.
5. Wright, A. E. Wound Infections, London, 1915.
6. Saint, J. A. *Lancet*, 1937, **1**, 1211, 1263.
7. Doubleday, F. N. *Guy's Hosp. Gaz.* 1941, **45**, 122.
8. D'Harcourt, J., Folch, A. and Oriol, A. *Brit. med. J.* 1940, **1**, 652.
9. Gordon-Watson, C. *Ibid*, 1941, **1**, 211.
10. Connell, W. K. *Lancet*, 1940, **2**, 22.
11. Hoffman, S. J. *Brit. med. J.* 1941, **1**, 785.

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anaerobic organisms, but a fair proportion of his cases nevertheless developed gas-gangrene.

The curtain-drainage action of bipp depends on the paraffin being liquid; paraffinum molle must not be used since this will not adhere to the wound walls. This fact should be borne in mind in preparing other applications for packing wounds. Moreover, LOCATELLI and BOWDEN [12] say that sulphanilamide in an ointment base is inert but in liquid paraffin its full bacteriostatic action is sustained. Now that local sulphanilamide is being extensively used it seems therefore that liquid paraffin, or some oil of like consistency, is the rational packing required so as to obtain both the bacteriostatic action of the sulphanilamide and the curtain drainage.

CARE OF THE TEETH

DENTAL students, like medical ones, are inspecting their world with a view to alteration and redecoration throughout. They have set about it in a mature and workmanlike manner which might be taken as a model for students of all professions; for their Memorandum on the Nation's Dental Services [13] is packed, not with ungrounded enthusiasms or pious hopes, but with solid information obtained by careful inquiry. The committee represents five London dental schools (Guy's, London and King's College and both the special dental hospitals) and is working in coöperation with some dental schools in the provinces. The memo reviews prewar and present conditions in dental education and in dentistry as a public service and as a career. Medical officers of health and school doctors are often enthusiastic about teeth, but otherwise the medical profession has remained curiously apathetic towards public dental services, here shown to be full of serious defects. Nor are the public properly educated in the care of the teeth; those attending dental clinics know quite a lot about fillings, but unfortunately public conservative dentistry in the past fell short of the best standards. Fillings have so often failed that people have become sceptical, and have in many cases reverted to the view that the dentist only exists to extract teeth. Thus the profession is faced with the difficult task of regaining their confidence and re-educating them. Some headway is evidently being made, for the numbers of insured people seeking conservative treatment are beginning to rise. The cost of conservative treatment, however, is often beyond the means of the uninsured, and it is useless, as the committee points out, to train the public to demand good dental treatment unless the dental services are adequate. The care of the teeth should begin before birth with the diet of the expectant mother; it is important that she should be taught this, but it is at least equally important that she should be introduced to the advantages of conservative dentistry before the child is born. In some L.C.C. hospitals all antenatal patients are seen by the dental surgeon and invited to have any necessary treatment; and the Eastman Dental Clinic has a staff of women dental surgeons who treat expectant mothers attending the Royal Free Hospital. These are exceptions, however; in most antenatal clinics there is no routine inspection by a dental surgeon.

The child, before he goes to school, gets little dental supervision beyond that given by the welfare doctor; though at a few welfare centres various degrees of dental treatment have been arranged. At school he is under the care of the school dental service. In 1939, it seems, 69% of the children inspected required treatment, but only two-thirds of these actually received it. In most cases dental inspection is only made once a year, and treatment can only be carried out if the parent consents and brings the child to keep the appointment. Local authorities usually employ only one full-time dental surgeon for 4000–6000 children. The provision is made for the numbers of children ordinarily accepting treatment; thus in a school population of 5000 only about 2300 children might be expected to accept. Good simple treatment can be given by one dentist to about 1450 children yearly; if that number is increased the standard of work suffers proportionately. This has been responsible for much of the unpopularity of conservative work in school dentistry; the parents can scarcely be blamed for refusing it in such circumstances, and that it often is refused is evident from the school reports. In Kent it has been noticed that many parents, though unable to afford private dental treatment for their children, are yet unwilling to take advantage of the clinics; in Holland, Lincolnshire, caries of the temporary teeth is increasing; and one Nottingham mother who had agreed to send her child overseas withdrew him when she was told that dental treatment was essential. Such incidents could have been avoided, perhaps, if the dental profession had resisted from the start any attempt to burden them with more work than they can do with credit. Some local authorities, however, are aware of the inadequacies of their services, and are doing their best to improve them. On leaving school at 14 the child can get no more dental benefit until he becomes eligible under National Health Insurance at 19. Much ill health and unnecessary loss of teeth result from this gap in treatment at a period of life when dental caries is most rife, and a large part of the work of the school dental service is wasted. There is a scheme for dental inspection and treatment of adolescents at Cambridge—apparently the only one in England. Coupled with their fine school service this has an opportunity to do invaluable work.

As things are, 13 million of our people get N.H.I. dental benefit and 5–6 million children and infants are covered by the school and infant-welfare services; this leaves 24 million for whom there is no regular provision of dental treatment by the state. Only a comparatively small proportion of these can afford to pay the full dental fees, yet most dental surgeons serve only this group. The dental register has remained stationary at 14,000–15,000 practitioners for the past fifteen years. The committee estimates that probably about 34½ million people need regular dental treatment, and that even if each of them visited their dentist only once a year, every dentist in the country would have to see at least eight patients a day. There are dental clinics, so-called commercial practices, which cater for the poorer sections of the community; these, run on efficient and economical

12. Locatelli, A. M. and Bowden, S. *Pharmaceut. J.* June 7, 1941, p. 25.
13. Issued by the Joint Planning Committee of Dental Students. Obtainable from the secretary of the committee, Royal Dental Hospital. 1s.

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lines and doing work of good quality, are financially very profitable. About seventy large firms provide dental services for their employees. It is significant of the present low standard of public education in the care of the teeth that a relatively small number avail themselves of N.H.I. facilities.

The 15,000 dental practitioners in the United Kingdom vary greatly in the training they have received. The committee sent out questionnaires to 11 English dental schools and received 8 replies. These showed that the average training in modern prosthetic techniques, orthodontics, radiography, anæsthetics, minor oral surgery and conservative dentistry for children is barely sufficient for the demands of good dental practice; and that the standard demanded of the student varies widely. Thus the numbers of dentures which students were required to complete ranged from 6 to 25 in different schools, and the hours spent weekly in conservation work varied between no fixed number of hours, 20 hours enforced, and 27 hours not enforced. In many hospitals there was lack of modern equipment, shortage of tutors and demonstrators, tendency to neglect backward students, and insufficient supervision. In addition the status and training facilities for dental mechanics are said to be poor, and the help that dental students receive from these skilled craftsmen is often inadequate. The committee promises to publish later a final section on planning for post-war dentistry. A remark in their last chapter deserves the attention of our medical planners: "The education of medical students in dental matters is deplorably neglected."

COOLING DRUGS AND COOLING CENTRES

IN the region of the hypothalamus there are centres which exert such a profound influence on temperature regulation that they have been designated the temperature centres. Their identification has stimulated a great deal of research on the physiology of thermal equilibrium and has provided a foundation for hypotheses purporting to explain pyrexia and the mode of action of antipyretics. The centres appear to act as a thermostat which in the human subject is set at about 98·4° F. but permits of a diurnal fluctuation of approximately 1° F. They are themselves sensitive to thermal variations in the fluid that bathes them—if the blood in the carotid artery is made excessively hot the skin reacts as it would to a sharp rise of external temperature. Mechanical irritation of the heat centres in experimental animals also causes a rise of temperature; the thermostat readjusts itself to operate at a higher level. This curious phenomenon made possible the classical experiments of GOTTLIEB on the pharmacology of the antipyretics. He showed that quinine and drugs of the phenazone group abolished this artificial pyrexia, but whereas quinine achieved its effect by depressing tissue metabolism (letting the fire burn low) the newer antipyretics struck at the heat-balancing mechanism; he also showed that these drugs shared with morphine and chloral hydrate a narcotic action on the thermogenic centres, which so upset equilibrium that thermolysis became urgently necessary in order to restore the balance. The loss of heat from the skin under these conditions is so brisk that cooling may be compared to flinging open the windows. The hypotheses of early workers receive corroboration from the fact that direct application of antipyretics to the hypothalamus is even more effective than intravenous administration. It is noteworthy that the antipyretic action of the phenazone group of drugs is seen only when the temperature is raised; they have no action on the normal subject. Such was the rage for antipyretics which prevailed in the closing decades of last century that attention was focused almost exclusively on drugs that produced dramatic effects which could be represented by precipitous curves on temperature charts. Pharmacologists of the time were slow to elaborate the conception of hypothalamic centres governing temperature regulation, but in 1901 HARNACK and his associates showed that picrotoxin, aconitine, veratrine and santonin lowered body temperature in apyrexial animals and they suggested that the action was probably due to stimulation of a cooling centre. The discovery that section of the cervical cord abolished the action of these drugs suggested an anatomical relationship to the other temperature-controlling centres, and it was found that a rise or a fall of temperature could be produced by electrical stimulation of various parts of the hypothalamus. Localisation was carried a step further by the discovery that lesions of the hypothalamus behind the corpora mamillaria produced a fall of temperature. The fact that the cooling action is diminished by hypnotics suggests that the centre responsible shares certain physiological properties with the thermogenic centres. The cooling action is accompanied by a decrease in oxygen consumption and a fall in the metabolic rate. Thus there is a resemblance between the action of quinine in non-malarial pyrexia and the effect of the picrotoxin group of drugs on the normal animal. Whether the resemblance amounts to anything more than a superficial likeness it is difficult to say; but perhaps it would be worth while to investigate the antipyretic action of quinine again from this point of view, using the new technique based on the thermocouple and the string galvanometer for measuring skin temperatures.

Lately ROSENTHAL,[1] working on rabbits, has confirmed that picrotoxin and aconitine, injected into the infundibular region, have a cooling effect on the animal; the fall of temperature amounted to 4·1° C. after 1 μg. of picrotoxin and 5·6° C. after 0·03 μg. of aconitine. The cooling effect of the two drugs injected simultaneously was greater than the algebraic sum of the effect of each. Arguing from observation of the side-effects of aconitine on the heart rhythm and on the electrocardiogram, ROSENTHAL suggested that the simultaneous disturbances of cardiac action are almost certainly due to stimulation of hypothalamic centres, and therefore that the cooling effect of the drug is also attributable to central stimulation rather than paralysis. The grounds for this hypothesis are hardly satisfactory. He mentions the side-effects on the heart as evidence suggesting the site of action of the drug, and anticipates the criticism that even the fall in temperature may be due to a toxic action on the cardiovascular system by stating that even when "no cardiac changes" occurred the body temperature fell considerably. It should be remembered, however, that normal electrocardiograms may be obtained even when cardiac efficiency has

1. Rosenthal, F. E. *J. Pharmacol.* April, 1941, p. 305.

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diminished to the point of circulatory collapse. Furthermore, the rapid onset of hyperglycæmia which ROSENTHAL shows as an accompaniment to the fall of temperature after aconitine suggests a sympathetico-mimetic action rather than vagal overactivity; indeed, a fair interpretation of this phenomenon is that the sharp fall of temperature stimulated the adrenal to staunch the flow of radiant heat by means of vaso-constriction, and that the accompanying hyperglycæmia reinforced this mechanism, which aimed at restoring thermal equilibrium. The well-known antagonism between picrotoxin and the barbiturates is illustrated by ROSENTHAL'S experiments; the cooling action of picrotoxin was practically abolished by the simultaneous injection of phenobarbitone. The fact that these two drugs cancel one another out in the pharmacological sense rather than by chemical union is confirmed by the observation that either of them alone is capable of producing a fall of temperature. Moreover, the masking effect of the phenobarbitone on the picrotoxin cooling phenomenon proves that this cooling action must be the result of stimulation of a separate centre and not merely the consequence of paralysis of heat-production centres. One of the dangers of being under the influence of narcotics is that these drugs produce increased susceptibility to changes in temperature in one's surroundings. HERRMANN [2] has shown that sub-hypnotic doses of depressants to the central nervous system, including morphine, pentobarbital and paraldehyde, cause loss of control over temperature regulation; and the toxicity of these drugs was found to be increased by low environmental temperatures. These results, obtained in animals, may have some therapeutic application in the management of patients who are allowed to go about while receiving hypnotic drugs—epileptics, for example, who are taking several grains of phenobarbitone daily. Furthermore, a few years ago we were assured by "the trade" that every sailor knows that rum keeps the cold out, and pharmacologists were bewildered by this contradiction to their own teaching. Certainly if HERMANN'S results are applicable to the methane series of narcotics generally rum is more likely to let the cold in, though the sailor with rum inside him may not care either way.

So far the drugs which have been shown to possess this cooling action are also noteworthy for their high toxicity. Picrotoxin is finding its way back into therapeutics merely as an alternative to strychnine in the treatment of barbitone poisoning, but even here the drug is rightly classified among the desperate remedies. Aconitine once enjoyed a considerable reputation as a diaphoretic and antipyretic, but a well-founded prejudice against cold sweats and increasing recognition of its harmful effects led to its abandonment by the physician. In any case, such a drug could hardly be expected to hold its own when aspirin was made available. Perhaps the main value of the recent precise work on cooling drugs is that it justifies a search for new substances—possibly synthetic products—with a pharmacological action on the hypothalamus comparable to that of the picrotoxin group of drugs, and yet having that margin of safety which POULSSON used to call "latitude of therapeutic action."

2. Herrmann, J. B. *Ibid*, June, 1941, p. 130.

Annotations

RADIOLOGY AS A CAREER

THE events of the last two years have shifted many medical careers into other channels and have raised doubts about the prospects after the war of this or that branch of medicine. There is however little doubt that there will be a shortage of radiologists unless newly qualified men turn their thoughts now in that direction. The Ministry of Health is prepared to enrol in the Emergency Medical Service radiology house-surgeons at selected hospitals in London and the provinces. Applicants must satisfy the deans of their medical faculties or schools that they intend to take up radiology and are prepared to enter for a diploma in medical radiology at the termination of their course of study. The selected hospitals will be so situated that attendance at courses of instruction will be practicable, and successful applicants will be required to undergo the appropriate course of instruction, paying the necessary fees. Applicants must have held a house appointment at a hospital for at least six months, and preference will be given to those with longer clinical experience. The salary will be at the rate of £200 a year with an additional £100 for board and lodging if the officer is required to live outside the hospital. Applications should be made (through the deans or group officers) to the Director of Establishments, Ministry of Health, Caxton House, London, S.W.1.

FOUNDATION OF THE NUTRITION SOCIETY

NUTRITION, more than almost any other subject, concerns scientists of widely different training and outlook. The clinician has always been concerned with dietetics, and in the last 25 years he has come to recognise more and more diseases caused by nutritional deficiencies. The study of the digestion, assimilation and metabolism of foodstuffs occupies many physiologists; and biochemists are engaged more on nutritional problems than on any other single branch of their science. Economists, sociologists, public-health officials, agriculturists and chemists too are all deeply concerned with the science of nutrition, but there has hitherto been no common meeting ground for discussion. Even the Biochemical and Physiological Societies and the nutrition panel of the Society of Chemical Industry include only a minority of those who are interested in nutrition. Before this war workers engaged on nutritional research had often discussed the desirability of founding a scientific society that would embrace all who had a genuine interest in the various branches of the subject. A year ago an informal group composed of about twenty representatives of the main laboratories working on nutrition started to meet about once a month. But it soon became apparent that even in war-time it was desirable to have meetings that were more formal and had a much larger attendance. Representatives of the institutes interested therefore met at the Royal Institution and decided to form the Nutrition Society, with the following provisional committee: Sir John Orr, M.D., F.R.S., Rowett Research Institute (chairman); John Hammond, F.R.S., School of Agriculture, Cambridge (vice-chairman); Leslie Harris, D.Sc., Nutritional Laboratory, Cambridge (hon. secretary); A. L. Bacharach, Glaxo Ltd. (hon. treasurer; Harriette Chick, D.Sc., Lister Institute; Ethel M. Cruickshank, Ph.D., School of Agriculture, Cambridge; H. H. Green, D.Sc., Veterinary Laboratory, Weybridge; Prof. H.P. Himsworth, M.D., University College Hospital; Prof. A. St. G. Huggett, M.B., St. Mary's Hospital; Franklin Kidd, D.Sc., Food Investigation Board; S. K. Kon, D.Sc., National Institute for Research in Dairying; B. S. Platt, M.B., Medical Research Council; H. M. Sinclair, D.M., Department of Biochemistry, Oxford. About 230 scientists who are or have been working on nutrition have been invited to become original members;

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this number includes about 50 medical men and women. During the war the society will hold meetings for the discussion of specific topics at various research institutes, and the first meeting is to be held at Cambridge on Oct. 18, when the subject for discussion will be "The Evaluation of Nutritional Status." The meeting starts at 11 A.M. with an introductory address by Sir Gowland Hopkins. This is followed by Drs. Harris, Sinclair, John Yudkin and G. W. Robertson on "Assessment of the level of nutrition in man"; Dr. Platt, Dr. R. H. Dobbs; and Mr. W. C. W. Nixon on "Clinical signs of dietary deficiency"; Drs. C. Crowther, Green and Hammond on "Nutrition of farm animals"; and then an open discussion.

It has been difficult in the past for the clinician to keep in touch with the advances made by the biochemist, and the agriculturist planning production has rarely been in direct contact with the dietitian who knows the community's needs. This new society will bring them together in the same room.

ELECTROLYTIC SODIUM HYPOCHLORITE

IN the treatment of wounds and burns by the envelope method, Bunyan[1] used sodium hypochlorite prepared by the electrolysis of brine in preference to Dakin's solution or eusol. Carey[2] has described a simple apparatus by which the dispensaries of the smallest hospitals could prepare the solution. A platinum wire and a carbon rod serve as electrodes. The electrolyte is cooled by passing a stream of cold water through a piece of glass tubing suitably bent. Failure to prevent the solution heating leads to formation of sodium chlorate. The solution used is 18% sodium chloride in water. Electrolysis sets free chlorine at the anode and sodium at the cathode. The sodium reacts with water immediately to form sodium hydroxide which in turn reacts with the chlorine liberated at the anode, forming sodium hypochlorite and sodium chloride. The process is continued until about 1% sodium hypochlorite is present. If the solution is then diluted twenty times an isotonic fluid results. Continuous current must be used; Carey used a trickle charger giving a potential of 12 volts and a maximum output of 1 ampere but this was rather slow. The yield depends on the amperage, and the reaction can be speeded up by using a higher voltage. The only limit is that set by the heating of the solution, which is also proportional to the amperage.

THE RICKETTSIASES

ANYONE who tries to classify and describe the many diseases now known to be caused by rickettsias must face the fact that there are still gaps in our knowledge of their ætiology, pathology and immunology, though on the clinical side there is a fairly broad basis of substantial fact. An attempt to summarise the present position has been made by Blumer.[3] The rickettsias are a widely distributed group of organisms primarily occurring in insects; possibly they may represent bacteria modified by generations of existence in insects, although it must be remembered that insects are also parasitised by true bacteria which show no similarity to the rickettsias. Some include the agents of psittacosis, trachoma, inclusion conjunctivitis, lymphogranuloma venereum and conjunctivitis in cattle, sheep, pigs and pigeons among the rickettsias, but at present it seems better to regard these organisms as viruses, for though they have certain morphological and tinctorial similarities to rickettsias there is no evidence that they are in any way associated with insects. Some of the rickettsias are pathogenic to man, to their insect hosts and to susceptible animals, while others are apparently harmless symbionts. Blumer points out that there are many similarities between the rickettsiases seen in man and animals. Thus all rickettsial infections are transmitted through vectors—lice, ticks, larval mites or fleas. A given rickettsia, however, may be transmitted by more than one genus of vectors or by different vectors of the same genus. In some rickettsiases there is a primary lesion at the point of inoculation; this is true of fièvre boutonneuse, South African tick-bite fever and Japanese river fever or tsutsugamushi disease but not of others. All the rickettsiases tend to present clinical resemblances in a sudden and often severe onset, a tendency to terminate by crisis, sometimes skin eruptions of a hæmorrhagic type and often involvement of the central nervous system. Recent observations suggest that many rickettsial infections involve the lungs setting up a pneumonitis or interstitial pneumonia. The essential pathological feature common to all rickettsiases is an involvement of endothelial cells. In the blood-vessels this involvement causes proliferative and degenerative changes that are chiefly responsible for the skin eruptions and hæmorrhages as well as for the changes in the central nervous system. It is curious that despite the frequency of typhus epidemics there is still no agreement as to the leucocyte changes in this disease, though there is evidence to show that a polymorphonuclear leucocytosis is more common than in any virus infection. In one important point exanthematic typhus shows a similarity to many virus diseases—in the occurrence of inapparent infections. In a Belgrade epidemic it was found that the serum of 13% of a group of apparently healthy people gave a positive Weil-Felix reaction in dilutions ranging from 1 : 100 to 1 : 800, and only one of the group had previously suffered from clinical typhus fever. The blood of some of them was still infectious for guineapigs.

OSTEOMYELITIS OF THE SPINE

Lannelongue[1] first described a case of osteomyelitis of the spine in 1879, but the difficulties of diagnosis and treatment have yet to be overcome. Three main clinical types have been described according to the degree of virulence of the disease process. In the fulminating cases the picture of septicæmia is uppermost, local signs being masked by the severity of the general symptoms. Blood-culture is almost always positive, and few reported cases have recovered. The subacute type is marked by early abscess formation in addition to the general signs of infection, and symptoms referable to the affected vertebræ are usually evident. Symptoms suggestive of an infection of the urinary tract are constantly seen when the dorso-lumbar region is affected, and may give rise to errors in diagnosis. Bony changes on X-ray examination are not seen until the third week, although radiography may be of value in disclosing deeply lying abscesses as early as the seventh day of the disease. The chronic type is more rare, but is of particular importance owing to the danger of confusion with Pott's disease. In differentiation age, rate of progress and the radiological appearances will help. Osteomyelitis mainly affects adults, tuberculous caries mainly children; even in the chronic type osteomyelitis progresses more rapidly than tuberculosis; radiologically, osteomyelitis destroys the intervertebral disc earlier and spreads more quickly to the adjacent vertebræ. Regeneration of bone is seen during the healing stage of tuberculosis, but this is more definite in osteomyelitis and usually goes on to new bone formation and even bony union. The three types of osteomyelitis were clearly differentiated by Butler, Blusger and Perry,[2] who described a case which was unaffected by sulphapyridine but steadily improved on sulphathiazole. Holmberg[3] has described seven cases,

1. Bunyan, J. *Brit. med. J.* 1941, **2**, 1.
2. Carey, J. *Pharmaceut. J.* Aug. 23, 1941, p. 68.
3. Blumer, G. Nelson Loose-leaf Medicine, New York. 1941. Vol. I. Renewal pages 191 to 202S.

1. Lannelongue, O.-M. Acute Osteomyelitis during the Period of Growth, Paris, 1879.
2. Butler, E. C. B., Blusger, I. N., and Perry, K. *Lancet*, 1941, **1** 480.
3. Holmberg, L. *Acta chir. scand.* 1941, **84**, 479.

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one of which he suggests was influenzal. He maintains that the rarity of osteomyelitis in the vertebræ when compared with the long bones is due to a local immunity of the vertebral red bone marrow. He points out that a focus of infection is often present and mentions that Fraenkel demonstrated bacteria in some patients who had died from infections although there had been no local symptoms during life. Apart from chemotherapy, whose value in this condition has yet to be confirmed, treatment consists of immobilisation in a plaster bed or jacket in the later stages, with drainage of abscesses and (rarely) with removal of free sequestra.

GROWTH OF THE OVARIAN FOLLICLE

As follicles grow they first sink into the ovary, and as they increase in size and develop thecæ and an antrum they move again to the surface. According to Strassman,[1] who has published a full account of his laborious research on follicular growth, the downward growth of the small follicle is due to the lesser resistance of the interior of the ovary as compared with the ovarian cortex. On the other hand the return of the follicle to the surface is due to eccentric growth of the theca interna, which develops a thick growing cone, overlaid by a thin and non-resistant layer of theca externa, towards the surface of the ovary. On the opposite pole of the follicle the theca interna is thinner but is overlaid by a thicker theca externa. The theca interna cone has a definite tropism to the nearest point of the ovarian surface; the granulosa cells can push their way more easily among the soft cortical cells than they can towards the deeper parts of the ovary. This conception of the way in which the follicle moves is different from older views which related the return of the follicle to the ovarian surface purely to mechanical growth. It will be interesting to discover whether the theca interna also plays an active rôle in ovulation, rather than the passive one which is generally ascribed to it.

PLANTAR RESPONSE IN HEALTHY INFANTS

THERE are said to be seventy articles in eight languages on the plantar response in infants, but Dr. Myrtle McGraw[2] of New York has usefully made the number seventy-one in a study of 75 normal children ranging from the newborn to the five-year-old. Repeated examinations were made at monthly or longer intervals and records of 1011 observations were obtained, of which 74 were on motion-picture film and 937 were written protocols. The stimulus consisted of a light stroke with a toothpick along the lateral aspect of the sole and across the metatarsal arch to a point proximal to the great toe. Notes were made of the reactions observed, including movements of the leg as well as flexion and extension of the toes. The types of response elicited could be broadly divided into three groups. In the younger children, and characteristic of the first four months of life, was the mass-reflex. Here dorsiflexion of the toes is accompanied by movements of the entire leg—contraction of the flexor muscles at the hip, knee and ankle as well as dorsiflexion of the toes. The most consistent part of the response is a sudden, total withdrawal of the whole extremity. Next comes the transition phase: the speed of withdrawal is diminished and consists principally of an abductor response of the leg. Plantar flexion of the toes is more common, although there is considerable variation in the movement of the toes and the great toe. This transition phase develops slowly and is predominant by the end of the first year. The third phase, termed the "segmental reflex phase," was common to all the children after the age of two and a half years. The response to plantar stimulation becomes increasingly restricted until it consists of movements of the ankle and toes only. Ankle movements are flexion, inversion and eversion, and the common response of the toes is plantar flexion, movements being much slower than those characteristic of the mass reflex. In a few children the type of plantar response was correlated with the development of erect locomotion, and in 26 out of 33 the onset of the third phase, the segmental reflex phase, occurred about the time of deliberate walking. Although in most children this third phase had been reached by three and a half years, dorsiflexion of the toes was elicited occasionally as late as four or five years. In these later age-groups, however, such extensor responses were not accompanied by the mass withdrawal reaction characteristic of the newborn infant.

1. Strassman, E. *Amer. J. Obstet. Gynec.* March, 1941, p. 363.
2. *Amer. J. Dis. Child.* June, 1941, p. 1215.

SYPHILIS OF THE LUNG

THE clinical diagnosis of acquired pulmonary syphilis is never easily made. This is due partly to the propensity of syphilis to mimic other conditions and partly to the rarity with which treponemata can be demonstrated before and after death. Pulmonary manifestations are unusual in the secondary stage. When they do occur they resemble, in the bronchial mucous membrane, the lesions found higher in the respiratory tract; a lobar pneumonic form has also been described at this stage. It is, however, in the tertiary stage that the parenchyma of the lung is most often involved and the standard works on respiratory medicine portray distinct pathological guises in which the infection appears. Pneumonia (sometimes with a lobar distribution), an indurative or fibrotic form, and gummata either large or miliary are all recognised. Pearson and De Navasquez,[1] from personal observations and a study of the literature, have lately sought to harmonise these multiple manifestations into the changing sequence of a single process. They regard an acute interstitial pneumonia as the starting-point; this may organise to produce a diffuse sclerosis or may undergo necrosis with gumma formation. The differences encountered, therefore, become one of degree and of time rather than of a fundamental type of reaction. They view the whole process of parenchymatous pulmonary syphilis as dependent on a disease in the mediastinum, and of all the organs that can act as a pivot point the aorta takes pride of place. Thus Carrera[2] found syphilitic infection in the heart and aorta of all the 12 cases of lung syphilis that he studied and the same was true of the case reported by Pearson and De Navasquez. The association is too constant to be solely due to chance, even when allowance is made for the high incidence of aortitis in syphilis, and it is now becoming axiomatic that the diagnosis of pulmonary syphilis, either during life or after death, is open to question unless there is found, in addition, reasonable evidence of specific aortitis or of aneurysm. The criteria for the successful clinical recognition of parenchymatous pulmonary manifestations of acquired tertiary syphilis can be summarised thus: (1) an anomalous history of pulmonary disease that may be brief or may be measured in months or even years; (2) the exclusion, by recognised methods, of other causes for the lesion, especially tuberculosis; (3) the presence of syphilis in other organs or the stigmata of past infection; (4) positive serological findings; (5) a ready response to antisyphilitic treatment particularly when revealed by serial radiograms; and (6) evidence of mediastinal disease, especially aortitis and aneurysm. Appraisal of all the evidence in the light of these points will do much to prevent the diagnosis of lung syphilis from resting on an insecure foundation; conversely, Dr. Clark's case reported in this issue comes as a reminder of how sometimes the spirochætal origin of an obscure pulmonary illness can confidently be inferred.

1. Pearson, R. S. B. and De Navasquez, S. *Guy's Hosp. Rep.* 1938, 88, 1.
2. Carrera, J. L. *Amer. J. Syph.* 1920, 4, 1.

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In England Now

A Running Commentary by Peripatetic Correspondents

THERE must be quite a number of people who move in circles far higher than I have ever had hopes or wishes of attaining who get a lot of quiet fun out of the present Anglo-Soviet accord. Some of us humbler ones have for many years tried to persuade our fellows that the inhabitants of the U.S.S.R. were not barbarians. We had tried to disillusion those of our colleagues who clung to the belief that savages with whiskers, blouses and top-boots, bloody in deeds and crude in ideals, were the rulers of the real U.S.S.R. We had tried to tell our fellow-workers in science and medicine that we did ill service to our calling in closing our minds to the remarkable contributions to knowledge made by the workers in the Soviet Republics. Now, I and those others who have striven to obtain some recognition for the Russian contributions to science, to medicine, to art and literature have the laugh of our fellows. It is almost pathetic to follow the painful efforts of our journals to fall into line in an inglorious unanimity for praising Russian scientific achievements. But to one who has striven in the days of that stupid blindness of British orthodox outlook towards these things, the whole business seems pitiful beyond the last dreams of cynicism. It is not a laugh that one gets from these reflections—it is a heart-wrung tear and a soul-felt prayer. Are we all so small that, because some of us by background, traditions, possessions or privileges disliked the Russian political regime, we fancied we could despise the scientific advances made by these people? Surely the world has been disillusioned by now. That the military organisation of the U.S.S.R. has surprised our wretched Blimps by its efficiency in warfare is a small thing. To surprise a Blimp is a trivial attainment. But that science, in the person of thousands of British scientific workers should be surprised, now that it has come to realise the advances made in the Soviet Union, is surely a matter for regret. It is a pitiful satisfaction to indulge in that lowest form of asserting one's justification by saying "I told you so": but at times it is difficult to avoid doing it.

* * *

Cecil Houses—only three now instead of five—have held by their bargain: women still find there tea and bread-and-butter night and morning, a clean bed, a hot bath, facilities for washing clothes and the use of a warm gay sitting-room, for a shilling a night with no questions asked. But for the first time since the original house was opened in 1927 the trust has ended up the year with a balance on the wrong side. Once the foundation costs are paid the houses are normally self-supporting; but nowadays rates, gas, light, fuel and provisions have all risen in cost; blackout materials have been a recurrent expense as blast and broken glass take their toll of them. The show house in Boswell Street was an air-raid casualty and has had to be closed until reconditioning is possible. The Kensal Road house is not easily reached in the blackout; the women hesitated to cross the dark canal bridge, and the reduction in numbers made running costs too heavy to keep open. It has been rented to the Ministry of Pensions during the war. The remaining three houses, though knocked about, have been able to carry on in spite of adventures in which they lacked gas, water and light, or contended with broken windows. No-one was hurt in these raids, but first-aid repairs to the houses have been costly.

Yet the houses are needed more urgently than ever. They provide for many women their only security, and in the circumstances it has become impossible to restrict the time each one stays. Some have settled in as permanent guests, ensuring their lodging for 7*s.* a week; others are temporary guests seeking lodgings between jobs, or women staying in London to catch sight of relations or friends in the forces as they pass through; others are themselves on leave from the Services. Nearly all are in work; they come back in the evening to cook their meals in the communal kitchen and exchange gossip of the day's doings before adjourning to share the sitting-room fire or—the younger ones—to enjoy dancing and music in a downstairs room. Before the war the houses were shut during the day, but now this regulation is relaxed; the houses are open in daytime, and those on leave can rest or read there. A fund is kept for those who cannot afford to pay the shilling, but it is rarely drawn upon; and there is a wardrobe for fitting out those who need them with clothing, hats and shoes. Women can bring their young children, paying 3*d.* for a cot beside the bed; mothers and children occupy a separate dormitory, so that a crying child will not disturb the other guests.

To prevent the danger of spread of vermin or disease the beds are inspected every morning; if vermin or traces suggesting disease are found, bed and bedding are sent to a disinfecting station. The occupant of the bed, next time she comes, is taken aside and asked in the first case, whether she is willing to go to a cleansing station, and in the second whether she will attend a doctor free of charge. She rarely declines but if she does it is explained to her that she cannot be admitted because of the danger to other lodgers.

* * *

The worst thing about Army doctoring is the little medicine in it. The work of an R.M.O. is invaluable and it couldn't be done by anyone else; but professionally it's unstimulating routine and clinically it hardly exists. Men must be kept healthy: if they misbehave by becoming sick off they go to hospital. In civil life the "diagnosis, ill; treatment, hospital" sort of practice was exceptional. In the Army, and for the best of military reasons, it is the rule. Now, the prevention of disease and promotion of health is a fine philosophy, and one to which I fully subscribe. Until the Golden Age arrives, however, it will still be useful for doctors to know quite a lot of medicine. Many of us in the Army, it seems to me, are in danger of disuse atrophy, of becoming stale and rusty, of forgetting the little that was acquired at such great pain, of finding ourselves on demobilisation with a necessary job done but worse doctors than we were on enlistment. This is a problem that wants tackling, and not by cosy planning but straightaway. Postgraduate education has never been a highlight of British medicine; it was never so badly needed as now. The answer seems obvious. In this country the hospital is the centre of medical education. Although this is strictly speaking not a military responsibility at all, the military hospital could take over this function for the military doctors and district it serves. Clinical meetings are already fairly common though there is plenty of room for expansion. Much more to the point, one hospital I know of organises regular week-end schools. The specialists do their stuff and the local M.O.s at the least enjoy it. Half lecture, half clinical, the two days are packed with streptococcal fevers, resuscitation, eyes, feet, vitamins, Vincent's angina, effort intolerance, mental deficiency, gas, oxygen, running ears, scabies, and so on. There's not much time for digestion in this rather Stakhanovite sort of effort but that happens afterwards, it is hoped. Schools like this, and on a larger scale, would be a great help.

The Army Medical Department itself issues excellent bulletins and leaflets from time to time, and courses are organised on many military subjects. Why not on just ordinary medicine and surgery? And run perhaps by the universities on the lines of the "intensive" weeks at Hammersmith? Of course everyone concerned is terribly busy. . . . Probably the most useful measures of all would be a wider sharing of G.D.O. appointments at the hospitals and part-time attachments to the hospitals. But these involve all sorts of issues on which I haven't the knowledge to speak.

* * *

Twice I have decided that this war really has gone on long enough—once on the awful morning when there was no marmalade for breakfast, and again at the week-end when the family joint was beef and there was no mustard. Being bombed in one's hospital or being called out as a member of a mobile unit to attend to air-raid casualties was all in the day's work and somehow rather impersonal; but these other matters brought the war very near home. Fortunately neither crisis lasted long; marmalade reappeared next morning and the mustard shortage was definitely overcompensated, since within a week our maid had produced a small tin, my grateful grocer patient a large tin and my sister turned up on leave with yet another large one.

This "grateful patient" of mine rather worries me. I had not seen him since well before the war, indeed I

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had forgotten all about him till the other week when one of these minor food crises which are continually cropping up reminded me of him. I hesitated a long time. Could I really have the brass neck to call on him, inquire after his health and gradually lead up to the major question of whether he could help me? In the end the domestic shortage of biscuits won the day—I took the plunge and the next time I was in his neighbourhood boldly entered his shop. I am sure he saw through me at once, but he played his part like a gentleman, and a weekly call now seems part of the routine of a visit to town. The result is that I am never so popular at home as on the day of my London visit, whence I now return with a medley of biscuits, jellies, tinned fruit blancmanges or lime juice—all those little extras utterly unessential to life but so delectable to the palate of a child. Actually my youngsters do not do too badly, as I usually manage to produce a weekly ration of chocolate from the enterprising steward of one of my hospitals who keeps a secret, if small, store of confectionery.

Another minor shortage which is threatening to modify our social habits is the scarcity of sherry. I must confess to a certain disappointment when twice within a week I was invited out to dinner and both times had to sit down to a completely teetotal meal, and when this was followed by an invitation to coffee, because "sherry is so difficult to get these days," I felt that life really was becoming rather hard. But when I tackled my own wine merchant he said he could let any of his customers have half a dozen bottles of sherry a week, and if any *Lancet* reader has the price of half a dozen I will reveal his name. I shall expect a non-teetotal dinner in return.

* * *

There have been a lot of letters in the *Lancet* lately about the treatment of venereal diseases in the Forces. It is all very well the military saying that opportunities are given for treatment, when necessary even by doctors who are not in uniform in establishments administered by civilian authorities. I know that most commanding officers do their best for their men, but there is still the idea that a man with v.d. is a defaulter. There is no point in arguing about this; it is certain that he is also sick and that to deprive a man with gonorrhœa of his treatment because his unit is going on manœuvres is not only unfair to the man but military shortsightedness, for it may lead to his permanent invalidism and loss from his unit. If the military really think (which I don't) that punishment has a prophylactic effect let it be given when he is cured and let his cure be expedited in every way.

There is another side to the question which seems to be almost completely neglected. There are concentrations of men in isolated rural districts which have only a very rudimentary public-health service. The soldiers get their treatment (and perhaps their punishment) without difficulty. In the case of their contacts the situation is reversed. The incidence of untreated female v.d. in certain rural districts is truly horrifying. It may be said that medical men as scientists have no business to be horrified, but what horrifies me is the attitude of local health authorities which refuse to recognise the very existence of the problem.

* * *

My wife has remarked that it's all very well my being high falutin' but what about infant's food. Admittedly we have an allergic daughter (Freud never explained why doctor's daughters are allergic) but the difficulty today in obtaining any artificial baby-food seems disproportionate. No doubt brands of artificial food are more numerous than the physiological needs of infants demand, but something should be done to standardise the position. There are times when we cannot buy any brand of cereal food in a market town of 12,000 inhabitants for a year-old child. Surely the manufacturers could agree among themselves and produce several standard products suiting various age-groups and requirements and thus remove at one blow present distribution difficulties and the artificial complexity of an advertisement-controlled market. While we are on this subject, why should not oranges be only purchasable on production of an infant's ration card? That would do more good to our war effort than using them as a diluent for gin in an A.T.S. subaltern's cocktail at a Thames-side inn. Yes, I can hear you asking what I was doing there. The answer is that I would'nt drink a Bronx if you stood me one. I like my alcohol recognisable.

Parliament

FOOD PRODUCTION AND DISTRIBUTION

CONVERSATIONS everywhere in England now turn often and eagerly to food. Our legislators also take at least an administrative interest in the topic for last week it was the subject of debate in both houses. In the Lords on Sept. 30 Viscount BLEDISLOE took as the text of his appeal for more feeding-stuffs for livestock the I.C.I. bulletin (No. 3) on "Home Production and Use of Feeding Stuffs in War." He asked whether the Government were in general agreement with its arguments and deductions; and whether in the light of them they contemplated amending their estimate of the number of livestock, especially poultry, we could maintain.

The bulletin urges that the Government's plans extend our acreage under wheat at the expense of crops grown for livestock, with an inevitable shrinkage of the stock and their products. Lord TEVIOT commended the words of Dr. Norman Wright[1] to the Government and urged that farmers should be allowed to keep at least 10% of their wheat for their animals.

Lord DAWSON said that experts did not always speak with a single voice and that he thought the Minister of Food, acting on misleading data, had over-penalised the hen, since it was a competitor for human food. But the intensive hen was a very remarkable creature, producing 180 eggs a year, and second only to the cow as a converter of feeding-stuff. Milk and eggs were a very tower of nutrition strength and especially useful in the preparation of light foods for workers beginning to get weary in mind and weak in their digestions. It was right that children and invalids should have priority but we also needed eggs to keep our active population fit and well, and housewives, a forcible group when they got going, were demanding that the production of the egg, an important appanage of their homes, should be maintained. It was important, Lord Dawson continued, that we should produce protein-rich food for our animals and hens, not next year, but within the next two or three months. In the manufacture of acetone there was a by-product containing large quantities of protein which had been used to feed pigs and other animals in the last war, but at present was being wasted. There was also a synthesised protein of high value, made in part of dried yeast, which, he believed, was ripe for manufacture on a large scale. He urged the Ministry of Food to hustle this on. Trial was being made with sheep cheese, and a higher nutrition value was to be obtained from the ewe in terms of cheese than in terms of mutton. Lord Dawson also pleaded that tuberculin-tested herds should be protected. Certain food officers did not seem to realise that these cows had been gathered together for years past and if anything happened to the herds it would take years to undo the evil. Yet an order had been issued to reduce the quantity of tuberculin-tested milk by 200 gallons a week by Oct. 18. It was ironical for such a thing to happen when concern was being felt at the increased incidence of tuberculosis, and he felt there must be some mistake. We should endeavour to stay the down-grade process in the production of milk, for production is like virtue. It is easy to make a reputation, still more easy to lose it, and once lost it takes a long time to rebuild. The Marquess of CREWE declared that the Ministry of Food was an expedient, not an institution, but that manure was the pivot of British agriculture.

The Duke of NORFOLK in his reply said that the Government was in agreement with the arguments but not the deductions of the I.C.I. pamphlet. It was true that we could not live by bread alone, but it was also true that we could not live by meat and eggs alone. Lord BLEDISLOE, while not pretending to be wholly satisfied, agreed to withdraw the motion.

The debate in the House of Commons on Oct. 2 dealt with the distribution of our food and Mr. JAMES GRIFFITHS made a strong plea for extra food rations for miners, quarrymen, railwaymen, and for women entering factory life for the first time. He spoke for the workers and said, "Give us the food and we will do the job." Prof. A. V. HILL gave scientific support and emphasised that vitamins could not replace energy in the diet of heavy workers. The science of nutrition must not be

1. See *Lancet*, Sept. 27, 1941, p. 373.

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invoked to cover up Ministerial deficiencies by unintelligent uniformity. Major LLOYD GEORGE heartened the House by his sympathetic and cheering reply. From Nov. 17, he said, the domestic fat ration will be increased temporarily from 8 oz. to 10 oz. per week and the sugar ration from 8 oz. to 12 oz. He hoped the dried fruit position would be much better. He wanted to encourage the provision of canteens for heavy workers and to allocate to them substantially increased quantities of some food. Catering establishments for essential workers would be treated in the same way. In the heavy industry canteens it was hoped to double the meat ration and to treble the sugar allocation. In trades where the work was not so heavy, meat allocation would be increased by a half and the sugar allocation doubled. He hoped also to make available increased supplies of bacon and ham, cooking fats, processed eggs, and cheese.

Sir E. GRAHAM-LITTLE said the diet of the heavy worker was better a hundred years ago when he had eaten wholemeal bread, milk and green vegetables instead of meat and white bread. He could not understand why the Government did not make our national wholemeal loaf compulsory. Today it is not even in general supply. Dr. EDITH SUMMERSKILL thought it was unfortunate that malnutrition was not accompanied by a rash and reminded the Minister of Food of the increase in tuberculosis among young women. She pointed out that the expectant mother is expected to sustain two lives on one ration.

Plans for Tomorrow

Speaking in the debate on the war situation Dr. HADEN GUEST said that the problems of the future were already reaching back to us in the present. One tremendous problem would be health in Europe and in this country. So far our health had been good but the report on public health in Scotland and other information showed that war conditions had caused an increase in tuberculosis. Our rationing and living and working conditions were good, yet in Glasgow there was an increase of 10% in tuberculosis due to the strain of war which would be multiplied in Europe and in the Soviet Union. Dr. Guest acclaimed the plans made at the conference of allied nations to send help and food to Europe as soon as hostilities stopped, but felt that Parliament might in principle go a little further. It would give heart to all people of good feeling if we began now to make plans on a world-wide scale to deal with the world health at the end of the war.

Wives without Children

On Sept. 30 Captain C. C. POOLE asked the Secretary of State for War whether he was aware of the poverty and hardship suffered by many wives and children of members of the Forces, and why these dependants were placed in a less favourable position than the dependants of those who remain in industry. Sir ROBERT GOWER also asked him if he was aware that experienced social workers reported that numbers of families of serving men find it impossible to manage on the present scale. Captain MARGESSON referred both members to the PRIME MINISTER'S reply to another question when he said that, while the recent revision of family allowances of junior officers was the first general improvement in the emoluments of officers since before the war, the family allowances of other ranks had been improved several times since that date and the pay of all N.C.O.s and men increased last year by 6*d*. a day war pay. But he was examining the suggestion that some of the families of other ranks are experiencing hardship and difficulty and he would make a further statement as soon as possible.

In this parliamentary backchat the emphasis is rightly laid on the family, for it is the soldier's wife with a brood of children who is having the hardest time today. Even with schools and day-nurseries it is difficult for her to get really remunerative work, and yet give her children the care and attention they need. But the wife without children can supplement her allowance with a well-paid job—indeed the Government is anxious that she shall volunteer to help build a spitfire or a tank. Or she may join one of the women's services, where she not only gets her board, lodging, and pay but also receives an allowance, contributed jointly by her husband and the Government. With plenty of work for everyone and not enough money to give as much as we would like to the soldier's children should we not think again about the distribution of our pennies and consider making motherhood and not marriage the qualification for an allowance?

QUESTION TIME

Medical Advisory Committees

In answer to a question from Sir ERNEST GRAHAM-LITTLE the Minister of Health said that none of the members of his medical advisory committees receives remuneration for their services. Their membership is as follows:—

Central Medical War Committee.—H. S. Souttar, F.R.C.S. (chairman); H. Guy Dain, M.B.; J. W. Bone, M.B.; H. W. Pooler, M.B.; Colonel A. H. Proctor, M.D.; Prof. R. M. F. Picken, M.B.; W. E. Thomas, L.R.C.P.E.; E. A. Gregg, L.R.C.P.I.; D. G. Greenfield, F.R.C.S.; P. Macdonald, M.D.; J. C. Matthews, M.D.; Prof. A. H. Burgess, F.R.C.S.; J. A. Brown, M.D.; G. E. Elkington, F.R.C.S.; F. W. Grant, L.R.C.P.E.; F. Gray, M.B.; J. M. Johnstone, M.B.; Sir Kaye Le Fleming, M.D.; S. A. Winstanley, M.B.; Charles Newman, M.D.; Sir Charles Wilson, P.R.C.P.; Sir Girling Ball, F.R.C.S.; Sir Alfred Webb-Johnson, P.R.C.S.; Prof. W. Fletcher Shaw, P.R.C.O.G.; T. G. H. Shore, M.D.; Russell J. Reynolds, M.B.; D. Embleton, M.B.; J. D. M. Cardell, F.R.C.S.; A. A. W. Petrie, M.D.; C. B. Heald, M.D.; Prof. Harry Platt, M.S.; G. Lilico, M.B.; Janet Aitken, M.D.; Sir Francis Fremantle, M.D.; Z. Mennell, M.B.; P. N. Panton, M.B.; J. Alison Glover, M.D.; Sir Hubert Bond, M.D.; R. W. Craig, M.D.; Prof. Sydney Smith, M.D.; and F. M. B. Allen, M.D.

Emergency Hospital Medical Service Committee.—Sir Robert Hutchison, M.D. (chairman); Colonel H. Letheby Tidy, M.D.; Sir Hugh Lett, F.R.C.S.; Sir Alfred Webb-Johnson; Prof. W. Fletcher Shaw; J. P. Hedley, F.R.C.O.G.; H. S. Souttar; F. Gray, M.B.; Charles Newman; Prof. Picken; Sir Girling Ball; H. E. A. Boldero, D.M.; Sir Charles Wilson; Prof. Burgess; K. W. Monsarrat, M.B.; Prof. L. G. Parsons, M.D.; W. Allen Daley, M.D.; Sir Maurice Cassidy, M.D.; R. M. Vick, F.R.C.S.; R. St. L. Brockman, F.R.C.S.; F. W. Grant; and T. H. G. Shore, M.D.

Committee on Physical Medicine.—Sir Robert Stanton Woods, M.D. (chairman); C. W. Buckley, M.D.; Sir Henry Gauvain, F.R.C.S.; F. S. Cooksey, M.D.; E. J. Crisp, M.B.; J. Cowan, M.B.; and J. G. Johnstone, M.B.

Committee on Rehabilitation.—Prof. F. R. Fraser, M.D. (chairman); R. I. Stirling, F.R.C.S.; J. F. E. Prideaux, M.R.C.S.; H. A. T. Fairbank, F.R.C.S.; Sir Robert Stanton Woods; G. Riddoch, F.R.C.P.; H. E. Griffiths, M.S.; J. Rhaiadr Jones; Lord Dawson, M.D.; Bernard Hart, M.D.; Gordon Holmes, M.D.; and Prof. G. Jefferson, F.R.C.S.

Committee on Tuberculosis.—Sir Percival Hartley, M.D. (chairman); J. H. Harley Williams, M.D.; J. B. McDougall, M.D.; D. A. Powell, M.D.; G. T. Hebert, M.D.; N. Lloyd Rusby, B.M.; J. Ferguson, M.B.; W. Allen Daley; and Norman F. Smith, M.D.

Shelter Health Committee.—Lord Horder (chairman); Miss Creswick Atkinson, R.R.C.; Sir Wyndham Deedes; R. C. Cox, M.Inst.C.E.; and Colonel P. G. Stock, F.R.C.P.

C.M.W.C. and Home Guard

Replying to a question Mr. BROWN said that to avoid undue interference with the medical organisation of the locality, Army Council instructions provide that no medical practitioner is to be enrolled in the Home Guard unless previous permission has been given by the local medical war committee. It is open to any practitioner aggrieved by the Committee's decision to communicate with the C.M.W.C. under whose general directions the local committees act. If he is dissatisfied with the conclusion of the central committee and wishes to make representations to me I shall of course be prepared to consider them. There is no representative of the Home Guard as such in the membership of the central committee but an observer attends on behalf of the War Office.

Medical Man-power

An interim report has been received from the Shakespeare Committee and action is being taken on the recommendations. These include suggestions for the establishment of regional committees to promote the maximum coöperation between civil and service medical establishments, the continued recruitment for the time being of medical officers for the Forces at the rate at which they are now being recruited, the compilation of particulars of bed accommodation and staffing for all civil hospitals and measures to secure greater mobility of resident medical staffs as between one hospital and another. (Mr. BROWN replying to Sir FRANCIS FREMANTLE.)

Alien Doctors

Under a recent order an alien doctor who fulfils the other necessary conditions may be placed temporarily on the Medical Register if he is to be employed as an assistant to a British doctor in private practice. The employment is in each case subject to the approval of the Home Secretary. (Mr. BROWN replying to Miss E. RATHBONE.)

Milk in Schools

In answer to a question addressed to the President of the Board of Education, Mr. J. C. EDE stated that in May, 1941,

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the number of public elementary school-children in England and Wales receiving milk under the scheme was 2,700,000 compared with approximately 2,100,000 in March, 1940. Including schools other than public elementary schools, it is estimated that in May, 1941, nearly 3,000,000 children were taking milk in school under the scheme.

Milk for the R.A.F. and Others

Replying to Flight-Lieut. RALPH ETHERTON, who asked whether it was proposed to modify the present nil issue of fresh milk to R.A.F. units, Major LLOYD GEORGE said that the present demand for milk is considerably greater than the estimated production during the winter months and to ensure adequate supplies for mothers, infants, children and invalids, a scheme of controlled distribution will be introduced on Oct. 12 on the lines indicated in his reply of Aug. 6. Adult consumers will receive part of their supplies in the form of condensed milk which will be available in much greater quantities than last winter, and it has been arranged that, save in special circumstances, the supply of milk to the Services shall be in this form.

Medical Prisoners of War

Mr. D. SANDYS, financial secretary to the War Office, stated that some 500 medical personnel and chaplains are entitled to repatriation under the International Convention of 1929.

Increase in Tuberculosis

Replying to Dr. E. SUMMERSKILL Mr. BROWN said that he had arranged for a special inquiry to be made, with the assistance of the Medical Research Council, into the causes of the war-time increase in tuberculosis. The latest information available shows that on June 30 there were 1763 persons in England and Wales who had been on local authority waiting-lists for institutional treatment for upwards of 10 days. Arrangements were being made to release some E.M.S. beds, but it was not merely a question of beds, but of nurses.

Answering a further question, from Sir E. GRAHAM-LITTLE, Mr. BROWN gave the following table of female death-rates (per million) from tuberculosis in England and Wales.

—	Respiratory		Other forms	
	Ages 15–20	Ages 20–25	Ages 15–20	Ages 20–25
1936 ..	670	1039	129	97
1937 ..	652	1029	130	116
1938 ..	605	931	132	93
1939 ..	601	955	137	90
1940* ..	692	1103	146	132

* Provisional, based on the 1939 population.

Medical Aid for China

Mr. A. EDEN announced that the Government have agreed to make a grant-in-aid of £50,000 to the British Fund for the Relief of Distress in China.

Annual Reports

Replying to Sir F. FREMANTLE, the Minister of Health stated that the regular series of reports of his department and of his chief medical officer will be suspended till after the war, but a summarised report will probably be ready within the next two months. The President of the Board of Education proposes to defer the annual reports of his chief medical officer until after the war. The Minister of Labour hopes to issue the report of the chief inspector of factories for 1940 within the next three or four weeks.

HOSPITAL SURVEY IN BRISTOL AND DISTRICT.—The new Bristol Hospitals Commission is sitting at the Council House, Bristol, Oct. 6–9 to initiate a survey of hospitals, voluntary and municipal, and of teaching services in the area with a view to meeting current needs and the expansion and reconstruction desirable after the war is over. The Lord Mayor has invited local contributory schemes to submit observations to help solve the financial problem of the voluntary hospitals. The commission consists of Sir Farquhar Buzzard, Sir George Martin, Prof. G. E. Gask, Dr. M. T. Morgan, Dr. John Buchan, Dr. J. P. Candler, Dr. A. Q. Wells, Alderman W. Hyde and Mr. S. Clayton Fryers.

Letters to the Editor

MEDICAL ASPECTS OF BOXING

SIR,—In an excellent book J. G. Crowther (1940) maintains that one of the outstanding scientists of the last century was Sir Humphry Davy. Davy was the first scholar who "sold science to the industrialists," who applied to a practical purpose a mass of expert information, making available to the people the fruits of a hitherto exclusively academic field of learning. The present state of physical education reminds me of that of British science in the time of Davy, Faraday and Joule. Physical education is one of the youngest children of science, unknown in its scope not only to the general public but to the majority of educated people. There are few whose concept of its medical implications enables them to apply our present knowledge. Physical education and sport are today still based on empiricism, not on scientific information, and many years must elapse before a rational attitude determines our policy.

Of all important branches of physical education, boxing is the only one in which injuries are not accidental events but form the essential aim of the sport. Every boxer tries to disable his adversary by hurting him, preferably through inflicting a head injury of such an intensity as to produce a state of unconsciousness. The fact that the various ring injuries have been dignified by popular terms such as "knock-out," "groggy," "punchdrunk" and others can, of course, not obscure the true picture. This was the essential point I endeavoured to bring out in a book which you have critically reviewed (*Lancet*, June 14, pp. 756, 759) without even mentioning my main argument. In my book I laid stress upon the unavoidability of head injuries being produced in amateur as well as professional boxing fights conducted under "regulation conditions." Ample evidence was presented to the effect that blows to the head, even if they do not lead to the immediate collapse of the fighter, very commonly are followed by serious after-effects; that the chin knock-out is a concussion of the brain notwithstanding the fact that it is caused by a specific traumatic mechanism and that its clinical sequelæ distinguish it in some respects from other forms of concussion.

Surely, Sir, all this is "incontrovertible medical evidence" which, incidentally, has been accepted by leading neurologists, among them Fulton and Hassin, who have expressed their agreement with my views. At a recent Air Force boxing tournament five bouts ended through knock-outs. Three of the unfortunate victims hit the floor with their occiputs while falling to the ground in an unconscious state. I am at a loss to understand how "repeated neuropsychiatric examinations" should be able to make such routine injuries impossible. I challenge any flight surgeon who wishes to tell me that the above mentioned Air Force boxers would not be severely handicapped in the course of their duties during the days following the knock-outs. No logically thinking physician can fail to see the difference between athletic accidents in general which are accepted as unavoidable accompaniments of every manly sport, and the deliberate infliction in the ring of brain injuries, many implications of which we have only recently learned to understand. Against this danger of head injuries other boxing injuries play a much less significant rôle, as my survey has revealed for the first time. The conclusion at which I arrived was clearly stated thus: "The dangers of boxing can only be eliminated by the total abolition of this sport." More especially, I felt it my duty to press for the immediate removal of boxing from the recreational programme of the armed forces.

The evidence on which I base my thesis that boxing must go divides itself into several categories. Primarily I rely on personal experiences and observations as well as the results of experimental and clinical investigations over twelve years. Taking a rather unorthodox view with regard to the extent to which medical information should be applied to practical issues, I have not hesitated to make use of descriptions given by boxers and other non-medical persons. While the quality of such contributions, naturally, varies within wide limits, I agree with Brend (1938) that whenever we deal with a social

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problem we are bound to take cognisance of lay views and opinions. For many years I have systematically collected the medical literature on the subject and read it. There is no scarcity of articles on boxing; the value of most of these articles, however, is limited. At the present stage of development of this new branch of medicine efforts must be concentrated on presenting well-studied case-histories. The "critical" and "systematic" publications of other more established branches of medicine are simply not available. Case-histories are in fact the medical equivalent of the measurement of quantities in the pure sciences.

Some medical writers (Winterstein 1937/38, Knoll 1938), more especially those who are extensively quoted in the lay press, abound in general statements about the medical implications of boxing but fail altogether to satisfy the above demand. Winterstein, for example, instead of presenting evidence, gives highly speculative psychological interpretations of incidents in the ring. On the other hand, experienced research workers like Parker, Guttmann, Bowman and Blau, Carr and Moody, and the Director-General of Health of New Zealand (Dr. Watt), have presented admirable case analyses. In evaluating the evidence I have laid emphasis upon this latter category. Every good case description was carefully considered and, if deemed advisable, included in my book. I did not hesitate to describe in detail Guttmann's excellent history of a case of paralysis of the right anterior serratus muscle in a boxer, while rejecting unsupported and medically valueless statements on punch-drunkenness. With regard to the latter condition, my own observations as well as a critical review of the few case-histories available in the literature showed me that we are not dealing with a clinical or pathological entity but with a multitude of conditions which still await an analytical neurological study. This is in agreement with the view expressed, for the first time, by E. Guttmann and myself in 1933. I therefore confined myself in my book to the presentation of original evidence never before collected, without drawing premature conclusions on its pathological significance. I abstained from discussing topics of which I have no personal experience; that is why the manifold ophthalmological problems of boxing are not treated in my book.

Finally, I asked myself whether the evidence at my disposal allows the drawing of definite *practical* conclusions. In the past the reluctance of research workers to apply conclusive scientific evidence to practical issues has been to the disadvantage of medicine. Notwithstanding that our knowledge of the medical aspect of boxing is as yet incomplete—knowledge is never complete—it is my considered opinion that the collected evidence warrants the demand that *boxing be eliminated* from all educational institutions and from the armed forces.

ERNST JOKL.

Witwatersrand Technical College, Johannesburg.

Crowther, J. G. British Scientist of the Nineteenth Century, Penguin, 1940. Winterstein, C. E. *Lancet*, 1937, **2**, 719; *Med. World, Lond.* 1938, **11**, 427. Knoll, W. G. *Med. Klin.* 1938, **34**, 1125. Parker, H. L. *J. Neurol. Psychopath.* 1934, **15**, 20. Guttmann, L. *Deut. Z. Nervenheilk.* 1937, **114**, 83. Bowman, K. M. and Blau, A. in Brock's Injuries of the Skull, Brain and Spinal Cord, Baltimore, 1940. Carr, J. L. and Moody, A. M. *Calif. West. Med.* 1939, **51**, 227. Watt, M. S. personal communication. Jokl, E. and Guttmann, E. *Münch. med. Wschr.* 1933, **80**, 560.

EXCLUSION OF NEUROTICS FROM THE FORCES

SIR,—May I endorse Dr. Minski's letter of Sept. 27? It is by now becoming obvious to those of us who work in the field of psychiatry that the psychotic and psychoneurotic are unsuitable persons for active service in the Forces. I believe this view to be shared by combatant officers. I admit that such a generalisation is capable of modification in individual cases. Dr. Minski's suggestion that a psychiatric examination should be available at the time of medical examination appears entirely reasonable and not too difficult of arrangement. That medical examination boards should have all specialist services at their call is surely desirable.

To the story of the epileptic who had enlisted five times I would add that within an hour of reading Dr. Minski's letter I heard that a youth whom I had examined in 1939 when he was a schoolboy, and whom I considered to be a schizophrenic with a bad prognosis, had just been "discharged from the Army."

Taunton. R. SESSIONS HODGE.

HOME GUARD PROBLEMS

SIR,—Mr. Abel seems to have been singularly unfortunate in his relations with the Red Cross. In my case, far from proving "so exsanguinated by red tape as to be almost invisible on its white background," the Red Cross has proved an exceptionally full-blooded friend in need to the Home Guard. Not only has the Red Cross Society accepted the responsibility of completing the equipment of casualty collection posts to a rather more exacting standard than that laid down by Mr. Abel but they have also relieved at least one Home Guard medical officer of a great amount of the office work involved in the setting up of these posts. Whilst a thinly populated rural district does not call for the establishment of a C.C.P. at intervals of not more than one mile, it does demand a sufficiently high standard of equipment and staff to enable casualties to be cared for at posts over a period of possibly many days, and it is solely due to the energy and freedom from red tape complexes shown by the British Red Cross Society that this has been accomplished in my area.

H. MARCUS BIRD.

SIR,—Your correspondents agree that in case of invasion casualties are most likely to occur in isolated country districts where there are few facilities for coping with them, and that Home Guard M.O.s should equip casualty collecting posts wherever they may be needed. May I endorse Dr. Sinclair-Loutit's suggestion that they will find competent assistants in the local district nurses—women who by training and experience are equipped to cope with any emergency, to assume responsibility in the absence of a doctor, and to improvise when orthodox material and methods are not available? The district nurse knows the neighbourhood, the buildings, the people. She can advise on the choice of a post, and organise her own local team of helpers. Most important of all, she can be left, under instructions, to deal with the casualties while the sorely pressed M.O. goes to other places more urgently needing him. The doctor could have no more reliable deputy.

J. ELISE GORDON,
London, S.E.1. Editor, *Nursing Mirror*.

CORROSIVE STRICTURE OF THE STOMACH

SIR,—The interesting account given by Mr. C. A. R. Schulenburg in your issue of Sept. 27 reminds me that I have been remiss in not reporting a case of this nature which occurred at the Royal Free Hospital in 1938.

Man aged 32. Admitted under Dr. Lee Lander June 3, 1938, having swallowed "considerable quantity" of strong HCl. Usual remedies applied at once. June 6, began to vomit. By the 16th, when he had a hæmatemesis, vomited practically everything he took. Hæmoglobin, 54% five days after hæmatemesis, rose slowly to 60% on Campolon and ferrous salts.

July 8: test-meal showed complete achlorhydria. Blood present on this and other occasions. June 28: barium meal revealed normal œsophagus but advanced atresia of pyloric end of stomach, little evidence of barium passing through. July 8: barium meal showed more gastric dilatation, no barium was passed through in 24 hr. July 15: I carried out a partial gastrectomy for almost complete stenosis extending from pyloric ring proximally for nearly 2 in. Mucosa of this portion of the stomach completely replaced by vascular granulation tissue, proximal to which was abrupt transition from inflamed part to normal gastric wall.

Aug. 4: patient left hospital in excellent condition having gained 5 lb. following operation.

As in Mr. Schulenburg's case the onset of stenosis was rapid, indeed it appears to have been nearly complete at the time of the first barium meal. I have not had the time to search the literature but as partial gastrectomy is not mentioned in Mr. Schulenburg's article presumably it has not been adopted before, yet it appears to me to have advantages over mere short-circuiting operation since it extirpates a segment of the stomach that is extensively damaged and the site of changes which may well develop into chronic ulcer of a peptic or even malignant nature. In my own case there were no special technical difficulties to overcome and the light percaine spinal anæsthetic with which I am accustomed to work was well borne.

Harley Street, W.1. CECIL A. JOLL.

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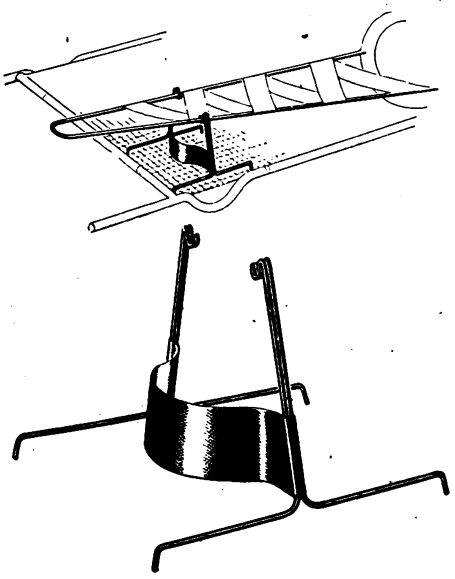
STRETCHER SUPPORT FOR THOMAS SPLINT

SIR,—Mr. W. G. Morden, of the Beckenham civil defence service, has designed the simple piece of apparatus here illustrated for the use of stretcher parties transporting a patient wearing a Thomas splint. The cost of material is negligible and the fitting can be made by any handy man within an hour. The fitment is intended for use with the standard pattern A.R.P. wire stretcher. It eliminates the need for the regulation suspension bar and requires no delicate adjustment. Made from ¼ in. iron rod and a piece of sheet tin it can be instantly adjusted to give support at any point along the length of the splint by a simple flexion movement. It measures 10 in. by 10 in. by 9 in. high.



Beckenham, Kent. T. PHILIPS COLE.

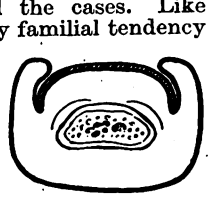
WASP AND BEE STINGS

SIR,—In Dr. Dyke's interesting paper in your issue of Sept. 13, in the report of case 2, this sentence occurs: "One of the girls, with commendable presence of mind, put ammonia on the site of the sting. . . ." So used I to do, and the last time this resulted in my wife having the worst wasp-sting I have ever seen. Now that I know better I put vinegar on and have never had a moment's anxiety since adopting this method, even with what I should once have considered serious stings of the lips, tongue or fauces. As far as I know the necessity for using dilute acids for wasp-stings and dilute alkalis for bee-stings was first pointed out by Mr. Edward R. Speyer in a letter to the *Times* of Aug. 20, 1919, which was commented on in the *Lancet* for Sept. 6, 1919 (p. 445). An interesting correspondence on this subject ran in the *Times* from Aug. 20 to Sept. 9, 1938.

Guildford. OSMOND H. BROWN.

INGROWING TOENAIL

SIR,—Mr. Nuttall's article of July 26 and Mr. Bonnin's letter the following week renewed an interest in ingrowing toenail which I have long felt. With Mr. Bonnin I consider that Mr. Nuttall's summary of the ætiology—"tight shoes"—does not cover all the cases. Like Mr. Bonnin I have noticed a decidedly familial tendency and cannot believe this is due to tight shoes. Choyce's "System of Surgery" states that it generally occurs in young adults; in men more often than women. My own experience accords with this view both as regards the age and sex of the majority of these patients. If the ætiology is solely tight shoes would it not be reasonable to expect that the cases would be much more numerous among women and that many cases would be found in later life? Both the occurrence in several members of one family, parents and siblings, and the shape of the nail lead me to believe that a certain proportion of cases are congenital defects or rather variations from what we consider normal. It does not seem accurate to say that "there is no ingrowth of the toenail" in this group of cases. Although many ingrowing toenails are flat and cannot be said to be ingrown a certain proportion are definitely curved in the horizontal plane and this variation seems to run in families. The free border of the nail, as viewed from beyond the tip of the toe, is not merely slightly curved but forms almost half an ellipse as shown in the drawing. The abnormality commonly occurs in children. This curvature of the nail must produce an exceptionally deep lateral nail fold which would surely not increase the pressure on the skin from the edge of the nail if the shoes are tight but rather decrease it, since now the nail border is parallel to the lateral nail fold and the lateral pressure would appear to be less likely to cause ulceration by pressure on the nail edge. A case I have recently seen caused me to query the effect of tight shoes. A lad of twenty had been in bed in this hospital suffering from rheumatic carditis, and of course had worn no shoes of any kind; immediately before this illness he had been in the R.A.F. for fifteen months. After fourteen months in bed he developed "ingrowing toenail" with severe sepsis on both sides of both big toenails. He had deep creases on either side of the nails which were exceptionally curved, and he denies ever wearing tight shoes; we know that this is true for at least 2½ years before his toes began to cause trouble. Can medical officers with wide colonial or other native experience tell us whether the condition we call ingrowing toenail is found in races who do not wear shoes?



Horton Emergency Hospital. E. J. RADLEY SMITH.

Obituary

CHARLES LEONARD DIGBY ROBERTS

M.B. EDIN., D.T.M. & H.

Dr. Charles Roberts, who remained in Guernsey to look after the civilian sick during the German occupation, died in St. Peter Port on April 12 soon after undergoing a major operation. He was born in Exmouth in 1882 and graduated from Edinburgh University in 1908. He came to Bart's to study for the English fellowship, and passed the primary examination. But he became interested in tropical medicine and went out to India, where he spent the greater part of his professional life. For some years he was medical officer at the Charteris Hospital in Kalimpong, a remote outpost which was the railhead for many Mount Everest expeditions. At the outbreak of the last war he joined the Indian Medical Service, and saw service in the Waziristan and Persian Gulf campaigns. After the war he practised for a short time in Darjeeling before he went to Assam, where he was medical officer to the Mariana Tea Association for many years. When he retired from India he went to practise in Guernsey, where he had hoped to enjoy a well-earned rest.

Roberts's chief hobby was the study of natural history, and in India he amassed a fine collection of butterflies. Some of his specimens were new discoveries and are preserved in the Natural History Museums in South Kensington and Bombay. His knowledge of the flora of the Channel Isles delighted those who accompanied him on his energetic walks along the cliffs and country lanes.

Dr. Roberts is survived by his wife, daughter and three sons. The sympathy of all will go out to Mrs. Roberts in her lonely exile.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 27

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1258; whooping-cough, 2247; diphtheria, 1066; paratyphoid, 100; typhoid, 32; measles (excluding rubella), 745; pneumonia (primary or influenzal), 485; puerperal pyrexia, 123; cerebrospinal fever, 94; poliomyelitis, 38; polio-encephalitis, 3; encephalitis lethargica, 6; dysentery, 89; ophthalmia neonatorum, 98. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 24 was 1246; including scarlet fever, 137; diphtheria, 272; measles, 23; whooping-cough, 534; enteritis, 24; chicken-pox, 29; erysipelas, 24; mumps, 7; poliomyelitis, 3; dysentery, 13; cerebrospinal fever, 15; puerperal sepsis, 9; enteric fevers, 42; malaria, 1; polio-encephalitis, 2; other diseases (non-infectious), 35; not yet diagnosed, 76.

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Deaths.—In 126 great towns there were no deaths from measles, 3 (1) from enteric fever, 1 (0) from scarlet fever, 15 (1) from whooping-cough, 28 (1) from diphtheria, 43 (2) from diarrhœa and enteritis under 2 years, and 3 (0) from influenza. The figures in parentheses are those for London itself.

Greater London, Watford and Blackburn each reported a death from enteric fever. There were 4 fatal cases of diphtheria and 3 of whooping-cough at Liverpool.

The number of stillbirths notified during the week was 187 (corresponding to a rate of 32 per thousand total births), including 14 in London.

Medical News

Royal College of Surgeons of England

The following demonstrations, which are open to advanced students and medical practitioners, will be delivered at the college in Lincoln's Inn Fields, London, W.C.2, during October at 2.30 P.M.: Oct. 13: Dr. A. J. E. Cave, constitution of the skull; 14: Mr. L. E. C. Norbury, benign neoplasms of the rectum; 15: Dr. Cave, vascular arrangements of the head and neck; 16: Mr. Norbury, malignant neoplasms of the rectum; 17: Dr. Cave, lymphatics of the head and neck; 20: Dr. Cave, surgical anatomy of the nasal fossa; 21: Mr. R. Davies-Colley, diseases of the testicle; 22: Dr. Cave, surgical anatomy of the mouth and jaws; 23: Mr. C. E. Shattock, tumours of the kidneys; 24: Dr. Cave, surgical anatomy of the pharynx and larynx; 27: Dr. Cave, surgical anatomy of the liver and bile ducts; 28: Mr. Davies-Colley, tumours of the intestines; 29: Dr. Cave, surgical anatomy of the kidney and ureter; 30: Mr. Shattock, tumours of bone; and 31: Dr. Cave, surgical anatomy of certain nerves.

University of Birmingham

Dr. Stanley Barnes has retired from the office of dean of the medical faculty which he has held for ten years. In accepting his resignation the council passed the following resolution:

For nearly 40 years, in addition to being actively associated with the local hospitals, Dr. Barnes held a pre-eminent position as a consultant. He sacrificed a lucrative practice to enable him to assist with the planning and building of the Hospitals Centre and the new buildings of the Medical School at Edgbaston. He always set for himself and others a high ideal of learning and scholarship, and staff and students for many years have owed much to him for the ability and unflagging zeal he has showed in promoting the interests of the Faculty with which he has been so closely associated. He has given liberally to the building funds of the Medical School, and the excellence of the building and equipment, generally acknowledged to be unsurpassed elsewhere, reflect in many directions the effect of his constant supervisory care.

Prof. Leonard Parsons, who has been deputy to Dr. Barnes for some years, has now been appointed dean. Dr. Parsons will continue his work as physician to the United and the Children's Hospital and regional officer for the Midlands to the Ministry of Health.

Prof. Lancelot Hogben, F.R.S., who has held the chair of natural history in the University of Aberdeen since 1937, has been appointed to the chair of zoology at Birmingham in succession to Prof. H. Munro Fox.

C.S.M.M.G. Salaries

The Chartered Society of Massage and Medical Gymnastics has recommended the following scale of salaries. It has been approved by the Ministry of Health for members of E.M.S. hospitals qualified in massage, medical gymnastics, medical electricity, and light therapy.

	Resident	Non-Resident
Chartered masseuse or masseur	£85–£10–£115*	£210–£10–£240*
Where only one masseuse or masseur is employed ..	£115–£10–£145	£240–£10–£270
Charge masseuse or masseur—		
Where two masseuses or masseurs are employed ..	£145–£15–£175	£270–£15–£300
Superintendent masseuse or masseur—		
Where three to ten masseuses or masseurs are employed	£175–£15–£205	£300–£15–£330
Where more than ten masseuses or masseurs are employed	£205–£15–£235	£330–£15–£360
Permanent part-time appointments (21 hours' work per week)		£130 per annum
Sessions of 3 hours or less		10*s.* 6*d.*

* After 5 years' service with same authority, and if recommended, 3 further annual increments of £10.

Members required to hold the additional certificate in hydrotherapy should be allowed a further £5 per annum, and those required to hold qualifications of other organisations, such as S.R.N., M.S.R., a further £20 per annum. Length of service and experience should be taken into consideration, and where no superannuation scheme is in operation the salaries given above should be increased. Where cost of living additions are granted the special bonuses should be in addition to the minimum figures given on this scale.

Naval Honours

The R.N.V.R. officers' decoration has been awarded to Surgeon Commander George McCoull, M.D. Durh., and to Acting Surgeon Commander G. F. S. Parker, M.R.C.S.

Medical Casualty

Surgeon Lieut.-Commander C. D. D. de Labillière, M.R.C.S., R.N., has been reported missing presumed killed, after the sinking of H.M.S. *Fiji* off Crete in May.

Medical Society of London

A meeting of this society will be held at 11, Chandos Street, London, W.1, on Monday, Oct. 13, at 4 P.M. After the presentation of the Fothergillian medal there will be a pathological meeting.

Shaftesbury Military Hospital Medical Society

A meeting of this society will take place at the hospital on Tuesday, Oct. 14, at 3 P.M., when Colonel J. M. Weddell, consulting surgeon to the Army, will survey the present position of surgery in the army.

Royal Medical Society of Edinburgh

Sir William Wheeler will open the new session of this society on Friday, Oct. 17, at 8 P.M. when he will give an address on what society has gained by the progress of surgery. During the session addresses will be given by Colonel F. A. E. Crew, Prof. G. B. Fleming, Prof. A. T. Jurasz, Dr. J. Trueta and Prof. Samson Wright. The annual dinner will not be held this year.

Births, Marriages and Deaths

BIRTHS

ALCOCK.—On Oct. 1, at Oxford, the wife of Squadron-Leader N. S. Alcock, M.R.C.P.—a daughter.

BURDEN.—On Sept. 29, at Alverstoke, Hants, the wife of Surgeon Commander A. J. Burden, M.B., R.N.—a daughter.

CAMPBELL.—On Oct. 1, at Cambridge, the wife of Captain E. C. Campbell, M.R.C.S., R.A.M.C.—a daughter.

HENDERSON.—On Oct. 1, at Pitlochry, the wife of Captain Walter Henderson, M.D., R.A.M.C.—a daughter.

HIGHAM.—On Sept. 29, at Didsbury, Manchester, the wife of Major A. R. C. Higham, F.R.C.S., R.A.M.C.—a son.

INGLIS.—On Sept. 28, in Glasgow, the wife of Dr. W. Elder Inglis, a son.

MARRIAGES

BOWEN-JONES—CORBETT.—On Sept. 14, at Liverpool, John Anthony Bowen-Jones, M.B., surgeon lieutenant, R.N.V.R., to Eileen Anne Corbett.

MANSON—MILLER.—On Oct. 1, at Streatham, London, Malcolm Manson, M.D., to Margaret Miller, M.B.

MOLE—BROOK FOX.—On Oct. 2, at Halberton, Richard H. Burnell Mole, M.R.C.S., to Catherine Rosemary Brook Fox.

DEATHS

CROSSE.—On Oct. 5, at Brundall, Herbert William Crosse, M.D. Edin., barrister-at-law.

KERR.—On Oct. 5, at Edinburgh, James Kerr, M.A., M.D. Camb., D.P.H., sometime school medical officer of London.

KERR RUSSELL.—On Oct. 5, William Kerr Russell, M.D. Durh., Ross-on-Wye, late of Harley Street, W.1.

WOOD.—On Sept. 27, Leonard Wood, M.R.C.S., colonel, late R.A.M.C., of Westbury, Wilts, aged 67.

YOUNG.—On Sept. 26, at Leeds, George Young, M.B. Glasg., late of Cockermouth, Cumberland.

Appointments

BARKER, KATHLEEN, M.R.C.S.: R.M.O. at Ilford maternity home.

BRASS, J. C., M.R.C.S.: R.S.O. at Poplar Hospital.

COOKE, R. C. H., M.B. Dubl.: R.M.O. at Bromsgrove Hospital.

DUNSMUIR, ALAN, M.B. Glasg.: temp. asst. M.O.H. and asst. school M.O. for Blyth.

ELDER, C. L., M.B. Glasg., D.P.H.: deputy M.O.H. for Middlesbrough.

FIRMIN, DOREEN, M.B. Camb., M.R.C.P., D.P.M.: temp. deputy medical superintendent at Caterham Hospital (L.C.C.).

LANDER, C. L., M.B. Lond.: examining factory surgeon for Maiden Newton, Dorset.

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Notes, Comments and Abstracts

HOME GUARD MEDICAL ARRANGEMENTS

Brigadier E. M. COWELL, F.R.C.S.

SOME notes on Home Guard medical arrangements from the Corps point of view, prepared for the course recently held at St. John's College, Cambridge, may perhaps be found useful for a wider circle.

Regimental Medical Officer.—The Home Guard medical officers appointment is not a sinecure. He has an immense amount of work to do in the next few weeks. Instruction of the battalion, company and platoon officers in field hygiene, sanitation and first-aid is his first task. Secondly, he must train his medical orderlies and regimental stretcher-bearers, the establishment of which is authorised. He must see that he has the equipment to which he is entitled and that it is tactically distributed. Company and platoon aid posts may possibly be required in addition to the aid posts and points of the Civil Defence Services.

Administration and Organisation.—In each zone the appointment of a medical adviser is now officially recognised. In many areas it is agreed that this officer should be a member of the public health service, either a senior M.O.H. who has made the civil medical arrangements himself, or his deputy or junior who is familiar with the existing arrangements. By coöpting the Civil Defence into the Home Guard many difficulties will be overcome. These zone advisers must work in close contact with the A.D.M.S. area, who will do everything to help. This officer is responsible to the D.D.M.S. corps for all details.

Invasion Committees.—An excellent plan has been initiated in East Anglia, whereby invasion committees have been established in counties, boroughs, urban and rural districts with smaller committees in every parish. These committees are completely representative and all invasion plans are prepared including defence, fire, food and medical. Those counties and authorities who have not yet established these committees are urged to do so without delay. Medical representation is essential.

First Aid Posts.—Keep the terminology simple. The Army Medical Services recognise R.A.Ps., C.A.Ps. and possibly platoon aid posts. The Civil Defence Services have F.A.Ps. which are posts or points. All these posts are "collecting"; the term C.C.P. is confusing, redundant and unnecessary. A small "medical packet" containing the bare minimum of supplies should be sealed and kept in safe custody where it will be required.

Conclusions.—The task is urgent and consists not so much in providing and establishing new organisations as in coördinating and "buttoning up" existing arrangements which belong, for the most part, to the Civil Defence Services. Provision of medical supplies is adequate; wise distribution must be carried out.

THE TOOTH OF THE DANE

THE shaming partnership between civilisation and bad teeth has been freshly illustrated by Christophersen's study of 316 skulls in the National and Anatomical Museums of Denmark.[1] The owners lived in the bronze and stone ages and champed away at the tough and simple diet which their essays in hunting and agriculture brought to the table—or possibly the floor. They had teeth which in occlusion, alveolar shape and position resembled those of their descendants; but their molars were stout and strong, their incisors were up to their work, and the older the eater the better his teeth. Caries was found in only 1·6% of 3612 permanent teeth examined, and only 15% of 274 adults had any caries at all. Among children caries was present in only 7%, but was found in 2·4% of 168 milk teeth. A coarse diet evidently did its work in cleansing and strengthening the teeth and in smoothing away those irregularities, fissures and cavities which favour the development of caries. These rude forefathers make a fine contrast to their posterity, whether in Denmark or elsewhere. Frandsen,[2] who made a study of 1200 contemporary Danish children found only 4 with completely sound dentitions. Regular dental care, it seems, falls to the lot only of children with well-to-do parents. The bad state of children's teeth is being used as an argument for establishing an organised national dental service in Denmark and for arranging for the systematic treatment of school children.

1. Christophersen, K. M. *Nordisk med. Tidskr.* March 1, 1941, p. 687.
2. Frandsen, O. *Ibid*, p. 688.

SCIENCE AND ETHICS

THE conference last month at the Royal Institution was evidence of the tremendous urge to find the right place of science in this disordered world. A symposium in *Nature* (Sept. 6) was directed towards defining the relations between science and ethics. Mr. C. H. Waddington, Sc.D., points out that increasing scientific knowledge, notably in the fields of anthropology, sociology and psychology (if this last is yet worthy to be called a science) has done much to destroy traditional ethical conceptions. Science is, however, in a position to make, and indeed cannot avoid making, a contribution to the new ethics since ethics are based upon facts of the kind with which science deals. So far few would wish to dispute with him, but he goes on to say that because a thing works it must be right and good. Thus, "we must accept the direction of evolution as good, simply because it is good according to any realist definition of that concept." But some of his critics join issue with him here. Julian Huxley reminds him that the majority of evolutionary trends are irrelevant to progressive change and that evolutionary progress is a rare phenomenom. This being so it would surely be wiser to accept evolutionary changes as a series of phenomena *outside* the scope of ethical judgment. Dr. Waddington is convinced that ethics cannot be avoided since they are part of the large system of compulsions and prohibitions which begins to develop in infancy. Here, he thinks, lies the practical difficulty. The young child may be taught that an aggressive attitude towards others must be controlled; but how and when is he to be taught that aggression includes, for example, the adoption of an unscientific attitude towards the social problem of nutrition? We should all like to have Dr. Waddington's faith that the fundamental notions of the scientific outlook will seep into the minds of mothers and nurses and so be unconsciously transmitted by them to the young. He wonders whether an adequate psycho-analytical study of those who have grown up in Soviet nurseries might not provide interesting evidence on this point. It has been observed, with cynicism no doubt but also with truth, that when confronted with two or more courses of action we choose the one that we least dislike; but it is the moral education we receive which determines what courses of action we like or dislike. It is surely one of the functions of science to equip us with the special knowledge to enable us to think clearly and so to act morally.

SHILLING A NIGHT

THE thirteenth annual report of Cecil Houses (Inc.) contains Miss Eleanor Farjeon's account of an evening at one of them; to read it is to share in the party. Every evening in the Cecil Houses must be such a party—a meeting of friends at home to exchange news and views, sympathy and jokes. Not many of us can buy such a chance for a shilling a night; but those who would like to keep the party going should write to Mrs. Cecil Chesterton, founder and hon. secretary, at 193, Gower Street, London, N.W.1.

Dr. James Macfarlane of the Department of Health for Scotland has been appointed medical liaison officer at the Scottish Office in London, and at the medical intelligence section of the Ministry of Health. He will maintain liaison with the medical branches of the service departments and other government departments in London.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS.—On Saturday, Oct. 25, at 2.30 P.M., Mr. W. C. W. Nixon will deliver the fourth Blair Bell lecture. His subject will be diet in pregnancy.

THE LOAN OF A MICROSCOPE.—The education department of the Royal College of Nursing needs additional microscopes for laboratory work in the sister-tutor course. Owing to the present difficulty in procuring these the director would be grateful to hear from anyone willing to lend or hire one or more microscopes to the college for the session.

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ORIGINAL ARTICLES

HÆMOGLOBIN METABOLISM

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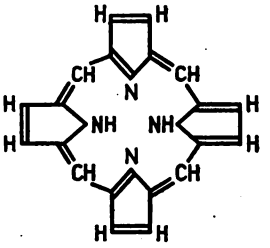
WHEN Hans Fischer began the study of the pigments excreted in the rare condition of congenital porphyria, it could hardly have been foreseen that the extension of this work would lead to a more thorough understanding of the metabolism of respiratory pigments in general, including hæmoglobin. Such investigations are difficult, and although Fischer and his co-workers synthesised hæmin in 1929 much further chemical groundwork has been needed before the results could be applied to the clinical problems of blood-diseases.

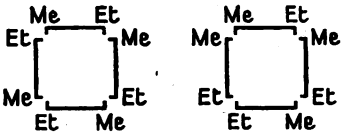
Hæmoglobin is formed by linking together a protein—globin—with an iron-containing pigment "protohæm." This protohæm is a combination of ferrous iron with a substance "protoporphyrin" which is closely allied to the pigments excreted in congenital porphyria. Fischer and his school have shown that all the naturally occurring porphyrins are variations on one theme—the "porphin" nucleus which is made up of four pyrrol rings joined by methene bridges (formula A). When the eight H atoms on the bases of the pyrrol rings are replaced by four methyl (Me) and four ethyl (Et) groups an artificial compound called "ætioporphyrin" is obtained. There are four possible isomeric ætioporphyrins, but the naturally occurring porphyrins all correspond to series I (formula B) or series III (formula C). There is no simple chemical way whereby series I compounds can derive from series III or vice versa; breakdown of the porphin nucleus and resynthesis would be needed and this is thought to be a very unlikely occurrence. The different porphyrins have different side-chains replacing the eight H atoms in porphin. Thus protoporphyrin has four—one CH_3, two $CH=CH_2$, and two CH_2-CH_2-COOH groups. Coproporphyrin, the normal excretion form, has four CH_3, and four CH_2-CH_2-COOH groups; uroporphyrin, with four CH_2-COOH and four CH_2-CH_2-COOH groups appears only in the porphyrias. Now the protoporphyrin of hæmoglobin belongs to series III, and Watson[1] showed that the free protoporphyrin in reticulocytes is also series III. Normal people excrete small amounts of coproporphyrin, about two-thirds in the fæces and a third in the urine; but all the fæcal and at least half the urinary coproporphyrin is series I and cannot therefore have been derived from the breakdown of hæmoglobin. Patients with hæmolytic anæmia known to be destroying large numbers of erythrocytes excrete relatively large quantities of coproporphyrin, but surprisingly this again is all series I. This unexpected finding that the excreted porphyrin is a different isomer and is therefore not derivable from the hæmoglobin porphyrin was called by Fischer the "dualism of the porphyrins" and has to be taken into account in any study of porphyrin excretion designed to throw light on hæmoglobin metabolism. It is not sufficient to know how much porphyrin is excreted—we must know to which series it belongs, and indeed Watson thinks it more important to know which than how much. Unfortunately the determination of the isomeric type is far from simple; it demands [2] the separation of the porphyrins, the preparation of their methyl esters and the determination of melting-points; and since the amounts excreted daily are measured in microgrammes, or only occasionally in milligrammes, skilled chemical technique is essential. For these reasons little data is at present available, but what there is is important.

In pernicious anæmia [3] there is greatly increased excretion of coproporphyrin I. When specific liver treatment is given the porphyrin excretion continues raised until after the reticulocyte peak is passed; then it slowly falls to normal. Coproporphyrin I is also excreted in large amounts in hæmolytic anæmia and in the period of blood-regeneration after hæmorrhage.[2] In aplastic anæmia,[4] on the other hand, from a fifth to a tenth of the excreted coproporphyrin is series III, and coproporphyrin III has also been found in poisoning by lead,[2] sulphanilamide [5] and other substances. Hence the excretion of coproporphyrin I seems to be linked with unusual erythropoietic activity, including the megaloblastic erythropoiesis of pernicious anæmia, but excretion of coproporphyrin III seems linked with depressed erythropoiesis. In the first group there is always evidence of excessive destruction of red cells, but as already pointed out the coproporphyrin I cannot have come from the red cells. Is the coproporphyrin III of the second group derived from hæmoglobin? Apparently not. Lemberg's [6] studies of hæmoglobin breakdown have revealed that porphyrins are not formed; the porphin nucleus opens while still attached to globin and iron and thereafter is converted into biliverdin and bilirubin; the excretion forms of bilirubin, urobilin and urobilinogen, are therefore used as indicators of hæmoglobin destruction.

Ingenious explanations of these contradictions have been suggested by Rimington,[7] Dobriner and Rhoads,[2] and Turner.[8] They all suppose that from a pyrrollic precursor porphyrins of series I and III are formed simultaneously, normally much more III than I, but if the production of III is increased I is increased proportionately. The series III porphyrin is protoporphyrin and is used in the formation of hæmoglobin, but the series I porphyrin is apparently useless—it is converted into coproporphyrin and excreted. Hence if there is unusually rapid formation of red cells more porphyrin III is needed for hæmoglobin and a correspondingly increased amount of porphyrin I is formed and excreted. But in aplastic and toxic anæmias, owing either to the absence of erythroblasts or to toxic interference with hæmoglobin synthesis, the porphyrin III still being formed is unused and is excreted as coproporphyrin III. The changes in congenital and acute porphyrias are attributed to disturbance of this orderly synthesis. There is no real evidence in support of this theory but it fits the facts partly at least. Rimington and Hemmings [9] have shown that toxic drugs like sulphanilamide which cause methæmoglobin formation also cause increased porphyrin excretion, and this is coproporphyrin III. Hence they suggest that this may represent an alternative method of hæmoglobin breakdown, but occurring only when methæmoglobin is a phase in the cycle.



Formula A.



Formulæ B and C.

Clearly there is still room for much more evidence before confident interpretations are possible, but the type of problem these results can be applied to is illustrated by Vaughan and Saifi's [10] investigation into the cause of anæmia in chronic infection. The porphyrins excreted by their patients were estimated by Rimington who reported a rise in the excretion of both series I and III. Since there was no evidence of increased hæmoglobin breakdown it was concluded that a disturbance of hæmoglobin synthesis was responsible. In a previous paper,[11] by correlating cytological examination of the bone-marrow with clinical findings, I was able to divide erythropoietic disturbances into broad groups. Further subdivision of these groups may well come from biochemical studies of hæmoglobin metabolism which can detect the conditions in which hæmoglobin is insufficiently available for normal marrow cells. The difficulty of the biochemical methods involved still stands in the way of really systematic investigation of the anæmias from this point of view. As Watson has said, what we need is a differential method permitting estimation of the amount of each isomer present without recourse to actual isolation. Until this happy day comes we must proceed, where we can, with the determination of the porphyrin isomers appearing in the various anæmias so

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that there will be sufficient data free from the bias of individual cases.

REFERENCES

1. Watson, C. J. Symposium on the blood and blood-forming organs. University of Wisconsin. Madison, 1939, p. 14.
2. Dobriner, K. and Rhoads, C. P. *Physiol. Rev.* 1940, **20**, 416.
3. — — *J. clin. Invest.* 1938, **17**, 95.
4. — — *Ibid*, p. 125.
5. Rimington, C. and Hemmings, A. W. *Lancet*, 1938, **1**, 770.
6. Lemberg, R. *Biochem. J.* 1935, **29**, 1322.
7. Rimington, *Proc. R. Soc. Med.* 1939, **32**, 1268.
8. Turner, W. J. *J. Lab. clin. Med.* 1940, **26**, 323.
9. Rimington and Hemmings, *Biochem. J.* 1939, **33**, 960.
10. Vaughan, J. and Saifi, M. F. *J. Path. Bact.* 1939, **49**, 69.
11. Israëls, M. C. G. *Lancet*, 1941, **2**, 207.

LIGATION AND CHEMOTHERAPY FOR INFECTION OF PATENT DUCTUS ARTERIOSUS

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KENNETH D. KEELE, M.D. LOND., M.R.C.P. — O. S. TUBBS, M.B. CAMB., F.R.C.S.

Note on the bacteriology by R. H. A. SWAIN, M.B. CAMB.

THE dangers of a patent ductus arteriosus lie in two main factors: the mechanical effect on the circulation and the local supervention of infection. Gross, in 1939, first ligated a patent ductus, since when some 20 or more cases have been reported. Gross and Hubbard (1939) considered that infection of the ductus contra-indicated ligation. However, in view of the hopeless prognosis in infected cases, operation combined with sulphapyridine therapy was considered justifiable in the two patients here described. Case 1 was the first example of successful ligation in the presence of infection yet reported (Keele and Tubbs 1940). The patient was operated on in December, 1939. Until April, 1941, when he was last heard of, he remained an active working citizen free from cardiovascular symptoms. Some hæmaturia from a coexistent nephritis persisted. The second patient was similarly treated by the sulphapyridine-operation technique in October, 1940, and remains well 11 months later.

CASE-HISTORIES

CASE 1.—Man, aged 23, admitted to St. Bartholomew's Hospital under care of one of us (K. D. K.) in October, 1939. Five months before had had febrile attack diagnosed as influenza, for which was kept in bed for 14 weeks, during which there was but slight improvement. Weakness and loss of weight (2 st.) progressed. Since this illness had never felt well. Periods of 1–3 weeks at work alternated with similar periods in bed. Recently dyspnœa on exertion had been noticed. No gross hæmaturia and no pain in chest or petechial rash had been observed. No previous illness, apart from "heart trouble" from birth; this had not prevented him from playing football and cycling.

Lightly-built pallid man (Hb. 45%). Small petechiæ over neck, shoulders and legs. Cardiac impulse heaving. Apex-beat 4¾ in. from midline. Palpation over the pulmonary base revealed thrill extending through systole into early diastole. Loud "machinery" murmur heard all over præcordium, maximal in region of pulmonary base, occupying all systole and large part of diastole. Pulmonary second sound audible. Blood-pressure labile, varying from 110/60 to 150/80 mm. Hg with patient lying in bed. Liver and spleen palpable. A teleradiogram showed slight enlargement of heart and prominence of pulmonary conus region. Red cells 2,665,000 per c.mm.; Hb. 45%; white cells 11,300 (polymorphs 80%). Sedimentation-rate, 135 mm. in 1 hour. Urine contained much albumin, with positive guaiacum reaction; microscopy of centrifuged deposit showed many red cells, pus cells and few granular casts; culture grew *Streptococcus fæcalis* (once only). Blood-urea, 71 mg. per 100 c.cm. Blood-culture positive for *Hæmophilus influenzæ*.

Course.—High intermittent fever, uninfluenced by general medical treatment and blood-transfusions. After 2 weeks sulphapyridine begun in dosage of 3 g. daily for 3 days; then 1½ g. daily for 18 days until operation. This small dose produced vomiting and depression, but also dramatic subsidence of fever. General condition improved considerably, but blood-culture remained positive. In view of this it was decided, after 3 weeks' improvement, that he had a chance of surviving ligation of patent ductus, and this was carried out by O. S. T. on Dec. 5, 1939. At the moment of ligation, blood-pressure rose from 108/60 to 120/80 and murmur at pulmonary base diminished to short rough systolic murmur, which has since remained unchanged. Post-operative course complicated, as expected, by further impairment of renal function, and development of uræmia. Headache, vomiting and oliguria accompanied rapid rise in blood-pressure to a maximum of 180/120. Blood-urea at this time 218 mg. per 100 c.cm. and alkali reserve 36·6. Some œdema of neck and upper chest; subsided within 10 days.

After this anxious period steady improvement ensued. Sulphapyridine had not been given during this time, but nevertheless the blood-culture became negative and remained so for 3½ months. The hæmaturia diminished and the blood-pressure slowly fell. At the end of March, 1940 (3½ months), blood-culture became positive again and three courses of sulphapyridine, each totalling 30 g. in 10 days, were given, with a week's interval between each. Since the final course the patient has remained afebrile. In spite of this a further positive blood-culture was obtained in June, 1940. The patient was then up and had no symptoms, volunteering that he had "never felt better in his life." Blood-urea 42 mg. per 100 c.cm.; sedimentation-rate 110 mm. in 1 hour. Urine showed red cells and some granular casts; urea-clearance 40% of normal. Blood-culture was negative 2 months later and has remained so since (January, 1941). When last seen (April, 1941) felt well. During a short period at home permitted after 9 months in hospital, returned to work (against our advice) and got married. No change in cardiac signs. Short pulmonary systolic murmur persisted. Blood-pressure more stable at 110. Sedimentation-rate 60 mm. in 1 hour. Red cells 5,530,000; Hb. 122%; white cells 18,000 (polymorphs 59%). Blood-urea 44 mg. per 100 c.cm. Blood-culture negative after 10 days.

CASE 2.—A girl of 19 who had always known that there was something wrong with her heart. Remained in good health until 4 months before admission to hospital. During this time complained of headache, lassitude and undue sweating at night, and fever present more or less continuously. No peripheral or pulmonary embolic symptoms. On admission intermittent fever present, ranging up to 100° and 101° F. Apex-beat 1 in. to left of midclavicular line. Typical systolic murmur and thrill of patent ductus arteriosus present, persisting well into diastole and loudest in second left interspace near sternum. Blood-pressure 132/40. Blood-culture yielded, on three separate occasions, growth of *Strep. viridans* in all tubes, colony-count in shake-culture numbering at first about 300 per c.cm. Red cells 3,800,000; Hb. 62%; white cells 14,800.

Course.—After a week, 6 g. of sulphapyridine per day given for 4 days; then reduced to daily dose of 4½ g. for 12 days. Fever disappeared and blood-cultures became less profuse and then sterile. Afebrile period lasted 12 days until operation on Oct. 21, 1940. After ligation of ductus (O. S. T.) febrile reaction occurred lasting 3 days. Temperature occasionally touched 99° F. during subsequent 3 weeks; then kept normal for whole convalescent period. Sulphapyridine continued at daily dose of 4½ g. daily for 5 weeks, when reduced to 3 g. for 4 days, after which it was omitted. Put on a stone in weight in first month. Has remained well for 11 months (September, 1941). Sedimentation-rate then normal.

SURGICAL TECHNIQUE *

The technique employed in these two patients was almost exactly the same as that described in detail by Gross (1939, 1940) for cases uncomplicated by infection, so that a detailed description would be superfluous; the main steps in the operation will however be outlined since no similar cases have yet been reported in the English journals.

Both patients received intravenous glucose-saline during the operation. The wisdom of this therapy is doubtful, since these people, like those with an arterio-venous aneurysm, have an increased blood-volume, and the sudden conversion of the circulation to that of the normal person therefore theoretically throws a temporarily increased burden on the heart; fluid put in artificially can only add to this increase. It is an insurance against

* The surgeon (O. S. T.) wishes to acknowledge that his interest in the subject was initiated by Strieder, who made the first attempt to ligate an infected patent ductus arteriosus (Graybiel, Strieder and Boyer 1938).

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possible rapid hæmorrhage, however, but it should be stopped as soon as the ductus is successfully ligated.

Anæsthesia was by a nitrous-oxide, oxygen and ether mixture (Dr. C. L. Hewer and Dr. F. Evans) in case 1, and by cyclopropane and oxygen (Mr. B. Rait-Smith) in case 2. An endotracheal tube was used in case 1 but not in case 2. The ductus arteriosus was approached through the left pleural cavity, which was opened through the second left intercostal space, the skin incision extending from the midline in front to the anterior axillary line. The second and third costal cartilages were divided close to the sternum and excellent exposure obtained by separating the ribs with a rib-spreader. The internal mammary vessels were divided between ligatures so that full use of the medial end of the incision might be obtained. In case 2, the two layers of pleura were adherent around the medial half of the incision and on the mediastinum and required separation by blunt dissection; the adhesions apparently resulted from infarction of the lung which was firm and red in this region. In both patients, the grossly enlarged pulmonary conus was seen to distend abnormally during systole and a well-marked thrill was palpable. In the first patient, the region of the ductus arteriosus was exposed by continuing the intercostal pleural incision on to the mediastinum, but it was found that the phrenic nerve and its accompanying vessels prevented adequate working room and had to be divided. This was obviously an error in technique and was corrected in the second case by incising the mediastinal pleura parallel with, and posterior to, the phrenic nerve which was then retracted anteriorly. No difficulty was experienced in either case in identifying the patent ductus.

The cellular tissue under the arch of the aorta was gently swept from the anterior surface of the ductus with a pledget of gauze held in a long hæmostatic clamp. Keeping immediately against the wall of the ductus, the adjacent tissues were readily separated by blunt dissection except from the posteromedial surface where a plane of cleavage must be found without a direct view. This was done by insinuating the left index finger into the cleft between the aortic arch and the bifurcation of the pulmonary artery anterior to the ductus and passing a malleable blunt-ended aneurysm needle through the tissues behind the ductus, so as to impinge on the left index finger, finally bringing the eye into view anteriorly to receive the ligature material. This part of the dissection must obviously be carried out most gently, keeping close to the ductus. Contrary to the experience of Touroff and Vesell (1940a), in neither case was anything but trivial hæmorrhage encountered. Nevertheless, if infection is not of recent inception, the surgeon must be prepared to find the walls of the ductus thinned, friable and adherent, and possibly an associated mycotic aneurysmal dilatation—a danger which has been much stressed by American workers. The recurrent laryngeal nerve was not identified in either patient, but it was thought that damage would be avoided by always keeping the dissection against the wall of the ductus. It is probable that physiological conduction was interfered with temporarily in the first patient, for he was hoarse for several weeks after the operation, but full recovery was present by the sixth week, when the vocal cords were examined by Mr. Norman Jory. There was no interference with voice production in the second patient.

The ductus was about ½ in. in diameter in the first case and a little more than this in the second; in both, the length was approximately ¾ in. The idea of excising the ductus appears to be excellent in theory but totally impractical. Gross's comment that "the ductus has always been so short that I have not dared to divide it in any instance" applied in our two patients. Two doubled no. 5 tubular silk ligatures were used to occlude the ductus. A faint thrill could be palpated in the pulmonary conus after applying the first ligature in each case, but it was abolished by the second. Finally, the mediastinal pleura was sutured and the wound closed in layers. Gentle positive pressure was used by the anæsthetist during closure of the wound so that complete reinflation of the lung expelled all the air from the pleural cavity.

POINTS OF INTEREST

Physical signs after operation.—In case 1 the classical signs of patent ductus arteriosus changed after ligation to a short rough systolic murmur at the pulmonary base. The palpable thrill disappeared. No detectable change in the size of the heart was found, though after ligation the pulmonary conus and artery seemed to be less distended during systole, being deprived of the blood regurgitated through the patent ductus. After operation the blood-pressure rose from 120/80 to 180/120 and the blood-urea from 71 to 216 mg. per 100 c.cm., since when there has been progressive improvement in these features.

In case 2, before operation the typical systolic murmur carried on into diastole had been present. After ligation it persisted and remained for some weeks nearly as loud as before. After 7 months it had become much less loud, the diastolic part of the sound being now nearly inaudible. This curious fact was also noted by Touroff, who in one case cut the ductus between the two ligatures, thus disposing of the criticism that the persistence of the murmur might be due to imperfect obliteration of the vessel. The blood-pressure, which before operation had been 132/40, rose after it to 154/122 the diastolic remaining higher than normal for 6 weeks. During this time the renal function became and remained impaired, the standard urea-clearance 15 days after operation being reduced to 21·9 c.cm., (29·2% of the average normal) for the first hour, and 15·2 c.cm. (28%) for the second hour. There had been no preoperative evidence of any renal or urinary abnormality.

Early diagnosis.—Both these patients, known to have congenital heart disease, remained febrile for 4–5 months or more before infective endarteritis was diagnosed. Case 1 had become almost moribund during this period; case 2 was in much better condition. An early diagnosis is obviously desirable in cases of infection of the ductus where ligation is to be attempted. Symptoms of infection are not dramatic and influenza may be diagnosed even when pyrexia is persistent. In case 1 this remarkable absence of symptoms was again shown after operation when he felt perfectly well, although a positive blood-culture was obtained. The same comparative well-being occurred in case 2 with the commoner *Strep. viridans* as the causative organism. Any patient known to have a patent ductus arteriosus who runs a fever for more than a week without obvious cause should be suspected of infection in this region and investigated accordingly. In case 1 the continuance of the focal nephritis, which darkens the prognosis, can be regarded as in some degree due to delay in diagnosis. Obviously the earlier operation is performed the less chance there is of renal or other complications.

Diagnosis of the heart lesion.—In both these patients the physical signs were typical of patent ductus arteriosus. In both the high pulse-pressure and the teleradiograms were confirmatory. There was no evidence of any other congenital defect, or of infective endocarditis of any valves, though such negative evidence must be of only limited value.

Pathology of the lesion in relation to ligation.—Maud Abbott (1936) describes the original site of infection as always being at the pulmonary end of the patent ductus. This is narrower than the aortic end. From here the vegetations spread over the left pulmonary artery far sooner than into the aorta. Patches of vegetations are found on the wall opposite the opening of the ductus, presumably carried there by the blood-stream which flows from aorta to pulmonary artery. Eventually the pulmonary valves may be involved in the spread of the vegetations. Thus left-sided pulmonary infarcts are common. Radiological evidence of them was seen in case 2 and a large one was found at operation. There seems to be no preoperative method of establishing the length of the patent ductus. If the ductus is sufficiently long, ligatures should be placed at each end, special care being taken to obliterate the pulmonary end as completely as possible. Periarterial adhesion and fragility of the wall of the patent ductus accounted for fatal hæmorrhage in two of Touroff's cases (Touroff and Vesell 1940b). In our cases the ductus was easily defined, the wall appearing pink but firm. No hæmorrhage occurred during the manipulations necessary for passing two silk ligatures. In case 2 some oozing resulted from the fact that the inner aspect of a moderately large pulmonary infarct lay over the region of the ductus.

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Bacteriology.—The organism isolated by blood-culture from the first case was a hæmophilus.

It was a small pleomorphic non-motile gram-negative coccobacillus and had no tendency to filament formation. In the first instance the organism was obtained in blood-cultures made in glucose broth incubated aerobically, where it appeared as small fluffy spherical masses on the surface of the blood. Later it was found that growth was considerably accelerated by cultivation in air to which 10% of carbon dioxide had been added. In subcultures the strain was found to lose its capacity for growth on solid media unless cultured in the presence of carbon dioxide. The colonies on solid media grown in the presence of 10% carbon dioxide were small, convex, with an entire edge, translucent and non-hæmolytic. The organism grew well on boiled blood-agar, Fildes agar, and 5% horse-blood agar. In 1% horse-blood broth and Fildes broth the organism grew well and gave rise to a slight granularity on the side of the tube. A scanty or moderate growth was obtained in the following media: serum broth, peptone broth, nutrient agar, serum agar, and inspissated serum. Well-marked satellitism occurred when serum or plain agar cultures were weeded with a colony of *Staphylococcus albus*. The organism did not grow in peptone water or in a filtered peptone water culture of *Staph. albus*. A growth did occur in peptone water to which X-factor in the form of hæmatin, or V-factor in the form of a heated yeast extract, had been added. The following sugars were fermented: mannite, inulin, dextrin, glucose, dulcite, arabnose, raffinose and salicin. Maltose, lactose, saccharose and galactose were not attacked. No indol was formed. The organism was agglutinated to a titre of 1 in 1250 by the patient's serum, but not by agglutinating sera of *Brucella abortus, Br. melitensis* or *H. pertussis*.

The morphology and cultural characteristics of this organism make exact identification difficult since it differs from *H. parainfluenzæ* described by Miles and Gray (1938) in its X- and V-factor requirements and from *H. influenzæ* in its biochemical reactions and affinity for carbon dioxide. Professor Miles has examined the organism and confirmed these findings; he suggests that the organism is an atypical strain of *H. influenzæ* resembling in its carbon-dioxide requirements *H. aphrophilus* described by Khairat (1940).

Sulphapyridine therapy.—Surgery would have been impossible in case 1 without previous sulphapyridine therapy, owing to the patient's very poor general condition. With sulphapyridine the patient had been afebrile for 3 weeks before operation. Although we have seen no case of this rare influenzal endarteritis treated with sulphapyridine alone, the likelihood of its being successful while the large mass of vegetations existed can be considered remote. With *Strep. viridans* infections it is well known that although temporary sterilisation of the blood-stream may be effected with sulphapyridine a fatal outcome is still nearly constant.

COMMENT

Hubbard, Emerson and Green (1939), in discussing the indications for ligation of the patent ductus arteriosus, conclude that the procedure should be limited to cases "showing evidence of circulatory embarrassment," among which they include signs of severe regurgitation. They doubted if ligation had any prophylactic value against subsequent infections. Time alone can answer this question. Gross has considered infection of the ductus a contra-indication because of the risk of producing embolism. Of this we have found no evidence in these cases, and such risk as there may be will certainly be diminished by early diagnosis and treatment. We are of the opinion that infection of the ductus arteriosus is a strong indication for ligation and should be combined with chemotherapy.

REFERENCES

Abbott, M. E. (1936) Atlas of Congenital Heart Disease, New York.
Graybiel, A., Strieder, J. W. and Boyer, N. H. (1938) *Amer. Heart J.* **15**, 621.
Gross, R. E. (1939) *New Engl. J. Med.* **222**, 510.
— (1940) *J. Amer. med. Ass.* **115**, 15.
— and Hubbard, J. P. (1939) *Ibid*, **112**, 729.
Hubbard, Emerson, P. W. and Green, H. (1939) *New Eng. J. Med.* **221**, 481.
Keele, K. D. and Tubbs, O. S. (1940) *St. Bart.'s Hosp. J.* **1**, 175.
Khairat, O. (1940) *J. Path. Bact.* **50**, 497.
Miles, A. A. and Gray, J. (1938) *Ibid*, **47**, 257.
Touroff, A. S. W. and Vessell, H. (1940a) *J. thorac. Surg.* **10**, 59.
— — (1940b) *J. Amer. med. Ass.* **115**, 1270.

CASE OF CRUSH INJURY WITH RECOVERY

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THE following patient received a crush injury towards the end of April, 1941. He has been under observation for four months and recovery has now progressed sufficiently to warrant publication of the findings.

CLINICAL FEATURES

Healthy man, aged 40, buried for 15 hours under debris of bombed building. Was lying on back with right hand and forearm raised across face. Pinned by beams which pressed heavily on right arm, right side of body, right thigh and leg. First came under observation about 24 hours after he was extricated; only facts known about this period are that he had passed no urine since the burial 39 hours before, and that treatment had consisted of warmth, morphia and fluids by mouth.

At no time was consciousness lost, and on admission he could describe experience rationally. There were signs of considerable dehydration and shock with dry and dirty tongue. No evidence of internal hæmorrhage but signs of complete lesion of right brachial plexus with fullness and tenderness in right supraclavicular fossa. Weals over right antecubital fossa, right side of chest, abdomen, right buttock, outer side of thigh, over both knees and on right leg ranged in diameter from 2 to 4 in. and looked like superficial burns. He was vomiting slightly and complained of nausea. Urinary output during first 12 hours negligible; urine contained cloud of albumin, granular casts and epithelial cells; specific gravity 1016. Blood-pressure 110/90 mm. Hg; blood-urea 140 mg. per 100 c.cm.

On the second day of observation he developed signs of severe pulmonary concussion with blood-stained sputum; subsequent radiography confirmed the diagnosis. Right forearm and thigh were swollen, especially thigh, which was tense and brawny throughout its length. No effusion into knee-joint; posterior tibial and dorsalis pedis pulses full and easily palpable. Circumference at mid-thigh 5 cm. greater on right than left, and 5 cm. below antecubital fold 7 cm. greater on right side than left (table I).

TABLE I—INCREASE IN CIRCUMFERENCE OF LIMBS ABOVE MEASUREMENT OF NORMAL LIMB ON ADMISSION (CM.). THIGH WAS MEASURED 15 CM. ABOVE PATELLA (LEFT 45 CM. ON ADMISSION); LEG 15 CM. BELOW PATELLA (LEFT AND RIGHT 40 CM. ON ADMISSION); FOREARM 5 CM. BELOW ANTECUBITAL FOLD (LEFT 23 CM. ON ADMISSION).*

Day	Thigh		Leg		Right forearm
	Left	Right	Left	Right	
1	..	5	..	..	7
3	..	5	..	..	7
7	..	2	..	..	7
12	..	5	..	..	7
13	..	4·5	..	2·5	7
14	..	5	..	1	7
16	2·5	9	1·8	5	7
18	5	10	4	7	7
19	2·5	7	4	8·2	7
22	5	10	3	8	7
26	..	6·2	pr.	pr.	pr.
27	..	5	,,	,,	,,
28	..	3	,,	,,	,,

pr. = slight œdema still present.

* After the patient's recovery the circumferences of the thighs and legs were the same on the two sides. The right forearm was then much wasted so that the measurement was no indication of that on admission. I have measured the forearms of a number of people, who, like the patient, are right-handed, and find the circumference of the right averages 1 cm. more than the left.

The case was recognised as a crush injury as described by Beall and Bywaters,[1] with pulmonary complications and a complete lesion of the right brachial plexus.

TREATMENT

At that time (April, 1941) 17 cases of this type had been described with 12 deaths.[1 2] Of the fatal cases 1 died of

1. Bywaters, E. G. L. and Beall, D. *Brit. med. J.* 1941, **1**, 428.
2. Beall, Bywaters, Belsey, R. H. R. and Miles, J. A. R. *Ibid*, p. 432; Mayo White, R. and Solandt, O. M. *Ibid*, p. 434; M.R.C. Subcommittee on Traumatic Œdema. *Ibid*, p. 449.

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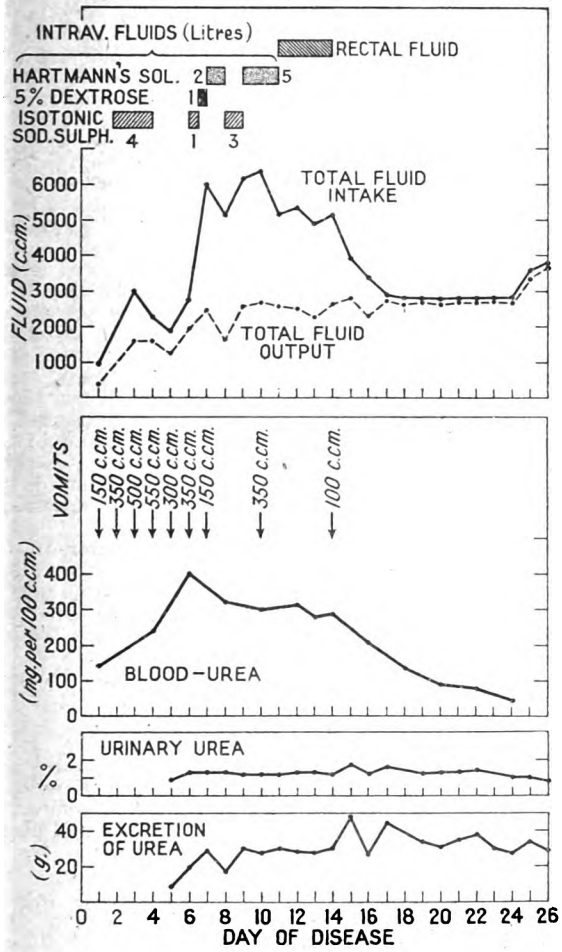
intercurrent septicæmia, in the other 11 the fluid intake had been relatively small and principally made up of serum, concentrated serum, plasma or whole blood. Since the treatment was admitted to be in the stage of trial and error



(Beall and Bywaters) a different approach was tried. This was based on complete protein starvation and forced fluids. Protein starvation was used because the biochemical findings in these cases suggested that more products of protein autolysis were being thrown into the circulation than the damaged kidneys could dispose of. On this assumption it seemed reasonable to add no more protein to that already there until there was evidence that it could be utilised and the end products excreted. Every form of protein was therefore withheld for 18 days, a low protein diet was then instituted and not till the 30th day was a normal diet free of protein restrictions allowed. The pathological appearances described in the kidneys associated with a mounting blood-urea and diminished urine were similar to the changes of congestive renal failure, as I have pointed out elsewhere.[3] In view of this it seemed worth while to employ the usual treatment for that condition. During the first few days the intake by mouth was small and most of the fluid was given intravenously in the form of isotonic sodium sulphate solution. The chart shows that despite a considerable intake of this solution no real diuresis took place and the blood-urea mounted steadily. When the peak of 400 mg. per 100 c.cm. was reached on the 6th day it was felt that the risk of death from pulmonary œdema was less than that from uræmia and fluid was pushed in by every available route. Rectal fluids were tried, but owing to the uræmia were not tolerated until the 11th day; fortunately the patient was able to drink between 5–6 pints daily and thus an enormous daily intake was achieved. The intravenous solutions used in the period between the 6th and 11th days are shown on the chart. Hartmann's solution was used in the later stages because of its close similarity to blood-plasma without the protein elements; in any case the need for sodium sulphate was no longer evident when the urinary output reached 2000 c.cm.

In view of the extensive necrosis of muscle and lesions of the adrenal cortex which had been reported, extract of suprarenal cortex was given from the start. Eucortone 4 c.cm. was given daily for 24 days and 5 c.cm. daily for a further 8 days.

Unfortunately the blood-chlorides, were not estimated until the 15th day and the blood-potassium and urinary chlorides were not estimated at all. Sodium chloride was given from the 18th to the 30th days in a daily dose of gr. 135 except on the 27th and 28th days when the dose was gr. 270. The highest of a very irregular series of blood-chloride figures occurred on the 28th day (table II).

In the later stages—6th week onwards—iron was given in massive doses. It was given continuously for 7 weeks and during the last 4 liver was given as well in an endeavour to correct the persistent anæmia. The appropriate drugs were used for the intercurrent complications and latterly ascorbic acid and vitamin B_1 have been used as part of a tonic regime. They appear to have improved the anæmia, but whether this will be permanent is questionable.

Local treatment was simple. The abrasions and weals were painted with 1% crystal violet solution. The affected limbs were placed in the position of rest; and as soon as possible an abduction frame was applied to the paralysed arm and physiotherapeutic treatment instituted.

PROGRESS

General condition remained very poor during first 10 days, with characteristic signs of uræmia. Thereafter improvement gradual and slow; with slight psychic disturbances about 18th day. On 38th day bronchopneumonia developed in left lower lobe; when recovering from this acute infection of throat with hæmolytic streptococci developed. Since this cleared up convalescence has been without incident. Blood-pressure readings are shown in table II. The blood-counts and hæmoglobin estimations in table II reveal constant degree of anæmia which is persisting despite treatment and is highly suggestive of some permanent renal damage. Icteric index was estimated by Meulengracht's method on 5th, 7th and 15th days; figures were all within normal limits (2, 4 and 5 units respectively). Clotting-time done on 7th day very prolonged (20 min., normal control 5 min.) Method of Lee and White used and estimation not repeated.

TABLE II—BLOOD-CHLORIDES, BLOOD-PRESSURE, HÆMOGLOBIN AND RED-CELL COUNTS

Blood-chlorides*		Blood-pressure (mm. Hg)			Hæmoglobin		Red cells
Day	mg. NaCl per 100 c.cm.	Day	Syst.	Diast.	Day	(%)	(per c.mm.)
15	220	2	110	90	13	62	...
19	500	4	125	85	15	63	2,540,000
21	500	5	110	80	21	68	...
23	125†	6	120	80	43	70	3,285,000
25	100†	8	120	95	56	70	3,400,000
28	700	9	150	90	63	68	3,490,000
30	300	10	140	75	70	80	4,000,000
36	200	11	140	80	78	70	3,880,000
					84	82	3,700,000
					95	76	3,500,000
					102	80	3,700,000

* By Whitehorn's method.
† These two results are low because the blood was allowed to stand for some hours before the estimation was done. They must therefore be discounted.

Urine was examined daily during first 4 weeks and varied little. Specific gravity remained between 1014 and 1012 for 12 days and thereafter dropped gradually to 1004. Daily output (see chart) rose slowly to 2500 c.cm. on 7th day and remained around that level throughout period of observation. Urinary urea was estimated by hypobromite method using a Doremus ureometer. Albumin constantly present; at first as light cloud, but after 15th day only as trace. Epithelial cells present in first specimen only; thereafter for first 6 days granular and hyaline casts and red blood-cells noted. Casts present for further 4 days; after that only occasional red cell seen. First specimen of urine was negative to reduced phenolphthalein test and contained no red cells. Urine never contained pigment and no pigment casts were observed. Blood-urea estimated by modification of Falen's method.

3. Maitland, A. I. L. *Ibid*, p. 570.

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Urea clearance was done 5 times and the results were as follows:

Day of disease	Blood-urea (mg. per 100 c.cm.)	Av. % of normal function
6	400	7
13	227	15
20	80	41
36	42	65·5
102	32	91

The swellings of right arm and right thigh were entirely different in character. Arm was seat of true œdema, greatest in dependent part of upper forearm, produced by deep hæmatoma around neurovascular bundle in supraclavicular area and due to stasis in veins and lymphatics of arm. It was present from the beginning and did not vary in size until it finally cleared up. Swelling of thigh was not true œdema but a brawny induration which did not pit on pressure and was most firm and longest in evidence under the weals. True œdema supervened later, affecting right leg first on 13th day and appearing in left leg and thigh on 16th day; some œdema also appeared over lumbar region on 22nd day (table I).

PRESENT CONDITION

Four months after injury is able to be up most of day. Blood-pressure 110/60, fundi normal and lungs have recovered completely. No relative wasting of right thigh but muscles very weak and resultant instability has produced small effusion into knee-joint. Left leg can be extended indefinitely against resistance of 10 lb. 32 times per min., but right leg can only be extended 18 times against resistance of 2 lb. 14 times per min. before fatigue supervenes; renal function has recovered almost to normal. Urine normal; sp. gr. 1012. Anæmia persists and appears to be resistant to treatment; brachial-plexus lesion is represented by recovering ulnar palsy.

DISCUSSION

The most striking feature of this case is the high proportion of the large fluid intake which was retained between the 7th and 15th days. During these 8 days 25·5 litres was retained without any great increase in the swelling of the limbs or the appearance of anasarca. The œdema which did eventually develop did not appear till the 16th day and reached its maximum between the 19th and 22nd days. This retention cannot be ascribed entirely to the administration of cortical extract and other factors in treatment, since the bulk of the fluid remained in circulation for at least 6 days. It must therefore have been required as a diluent of some abnormal substance in the blood, probably a high molecular protein derived from the damaged muscle. The two cases of this syndrome recently reported [4] appear to have had a similar course to the one described here. Unfortunately the fluid retention, if any, in each case is not stated. In one of them (Longland and Murray), however, the clinical features suggest that a true transfusion kidney cannot be excluded; since the patient had a rigor after a plasma-transfusion, followed by icterus and unaccompanied by swelling in the injured limbs.

The glomeruli of the kidney are supplied with blood direct from the interlobular arteries through the afferent glomerular vessels; the tubules and loops of Henle are supplied by capillaries derived from the efferent glomerular vessels, and the collecting tubules and ducts of Bellini are supplied from the main branches of the renal vessels through the arteriæ rectæ. The lesion associated with the crush syndrome is situated in the convoluted tubules and loops of Henle, and it will be seen that the blood-supply of this area comes through the reducing chamber of the glomerular capillary bed. There, not only is the pressure reduced but the blood is concentrated by the loss of fluids and salts secreted by the glomerulus. In the light of this knowledge a cause for the lesion suggests itself. In all the cases described severe shock has been a feature. This is shown by the low blood-pressures recorded. In some cases both systolic and diastolic pressures have been low; in this case the systolic pressure alone was low. It can be presumed that this shock has its onset when the patient is first buried and therefore is prolonged over many hours. This will produce in the capillaries of the convoluted tubules a vicious circle of vascular stasis, hæmoconcentration and thus more stasis. These changes will be increased by the absence of fluid intake during the buried period and the flooding of the circulation with a protein of high molecular weight from the damaged muscle. There is experimental evidence [5] that a rapid elevation of blood-pressure during the recovery period may produce further tubular damage by intensifying this stasis in the vessels of the convoluted tubules.

This hypothesis is supported by the following clinical evidence: (1) the invariable presence of abnormality in the first specimen of urine examined; (2) the common critical point in all cases between the 6th and 8th days; (3) the fatal termination in one case despite amputation of the crushed limb; and (4) the recovery of two severe cases with general measures only during the first 24 hours followed by the usual treatment of congestive renal failure. The conclusion is that this lesion is produced primarily by the long period of lowered blood-pressure or pulse-pressure aggravated by the absence of fluid intake during part of that time and the presence of an excess of a circulating protein derived from the damaged muscle. It is in fact an active congestive renal failure with a possible toxic element superimposed and it may be intensified by too rapid elevation of the blood-pressure, particularly if that elevation is produced by plasma or concentrated serum. The experience of this condition is limited and the theory outlined requires more evidence for its proof, but it seems reasonable and worth further investigation by animal experiment and clinical observations.

The lesions described in the adrenal cortex in two reported cases and the irregular behaviour of the blood-chlorides in the present case despite a constant dose of cortical extract and sodium chloride suggest that some similar changes to those in the kidney may take place in the suprarenal cortex. They certainly point to the necessity for examining the blood and urinary chlorides from the start in these cases.

SUMMARY

A man, aged 40, developed severe renal failure as a result of burial for 15 hours under a bombed building. He was pinned across the right thigh and right side of the trunk. He also had a lesion of the right brachial plexus and pulmonary concussion.

He was treated by complete protein starvation and forced fluids, with injections of suprarenal cortical extract. A large proportion of the fluid was retained between the seventh and fifteenth days without any corresponding increase in the œdema, though a general anasarca was present from the sixteenth to the twenty-eighth day.

Improvement began on the tenth day, and four months after the injury the patient appears to have made a good recovery, in spite of an intercurrent bronchopneumonia and a streptococcal infection of the throat. An anæmia persists in spite of treatment, which suggests some renal damage not evident to tests of function; and the affected thigh, though anatomically normal, has lost almost all its extensor power.

It is suggested that in such cases the renal failure is caused by vascular stasis due to lowered blood-pressure from the time of the injury, to the lack of fluid intake during the period of burial, and to flooding of the circulation with protein from damaged muscle. The lesion in the kidney may be aggravated by transfusion with plasma or concentrated serum.

I have to thank Surgeon Rear-Admiral F. J. Gowans for permission to publish this case; Surgeon Commander R. S. Allison for his help and criticism during the treatment of the case and preparation of this paper; and C. P. O. Webster and the staff of the clinical laboratory for the estimations.

4. Henderson, R. G. *Ibid*, 1941, **2**, 197; Longland, C. J. and Murray, J. *Lancet*, 1941, **2**, 158.

5. Miller, H. *Brit. med. J.* 1941, **1**, 685.

MEDICAL DEFENCE UNION.—The annual meeting of this society was held on Sept. 30. Dr. G. de Bec Turtle, acting president, who was in the chair, said that the membership was now over 24,000. War had not decreased litigation and he urged doctors to exercise great care in signing medical certificates. Dr. Turtle was elected president for the coming session.

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CYCLOPROPANE ANÆSTHESIA

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MANY papers have appeared on the pharmacological and physiological aspects of cyclopropane. I shall here deal with the application of this knowledge to its administration as an anæsthetic, in the light of experience I have gained during the past few years.

Perhaps in no other type of anæsthesia is the apparatus used of such importance, for an inaccurate, leaking, inflexible apparatus will make for failure, and greatly add to the difficulties of the administrator. The principles of an ideal apparatus have been described by Harris (1933, 1935, 1938), and I agree with him in favouring the circle filter as against the to-and-fro principle of Waters (1932). Although the latter has the advantages of portability and simplicity it is difficult to handle: the irritant soda-lime is too near the face-piece, greatly increasing the danger of its inhalation: while the heat induced in the canister directly affects that part of the gas mixture which is immediately inhaled. On the other hand, the circle filter if correctly designed provides a flexible apparatus which more closely satisfies physiological requirements, and with an adequate canister can produce a more complete absorption of carbon dioxide. In contrast to the method practised by most anæsthetists, I find that less resistance to respiration is produced when the canister is placed on the inspiratory side of the circuit, and this clinical impression is supported by manometric readings of the resistance induced in various types of apparatus at the face-piece end of the circuit.

Sensitive directional valves, offering the minimum respiratory resistance, are a necessity. They should be designed to work efficiently with the reduced tidal respiration met with in deep anæsthesia. They should be placed as close to the face-piece as possible, for theoretical considerations, fully explained by Harris, demand that the dead space between the unidirectional valves and the alveoli should be less than the volume of the smallest tidal respiration. (Placing these valves on the machine takes no account of the expansile nature of the long rubber tubing between the valves and face-piece, and permits excessive re-breathing, especially when pulmonary ventilation is reduced.) This ideal is almost impossible to attain, but the closer it is approached the less will be the respiratory embarrassment, the smoother the anæsthesia, and the less fatigued the patient at the end of a long operation.*

ESTIMATION OF DEPTH

The quietness of the breathing under cyclopropane is due not so much to the carbon-dioxide method of administration as to the depressant effect of the gas on the respiratory centre. The usual signs of anæsthesia as seen with ether are not helpful, and estimation of depth is difficult. Passage through the first two stages is very rapid and no excitation of respiration is seen even in induction; in the third stage a slight and progressive decrease in rate and tidal volume occurs, until intercostal paralysis is complete; a small increase in concentration will now cause respiratory arrest.

Waters (1936) has shown how the patient may pass through the third stage without manifest signs except a gradual diminution in respiratory movement. The increase in rate and depth of respiration which usually occurs with other agents just before respiratory arrest is slight or lacking with cyclopropane, which makes it difficult to differentiate the pre-apnœa level. Attention to detail is therefore essential. Romberger (1935, 1937) and Guedel (1937) have described a system of anæsthetic signs, but these are not complete, because they fail to take into account the phenomenon of general muscular relaxation; they are also often difficult to assess, especially in cases where the respiratory threshold has been elevated by preoperative drugs.

I find the following simplified scheme (worked out with reference to the respiratory signs only) satisfactory for teaching purposes. Where planes of anæsthesia are referred to in this paper this scheme is to be understood.

Third stage	*Signs*
First plane:	Light anæsthesia; moving eyeballs.
Second plane:	
(Upper):	Moderate anæsthesia; fixed eyeballs; intercostal paresis absent or partial only.
(Lower):	Deeper anæsthesia; intercostal paralysis becoming complete. (The diaphragmatic movement is not exaggerated as it is with ether.)
Third plane:	Intercostal paralysis has developed gradually and progressively, without any change in the character of the breathing, which is now almost entirely diaphragmatic. A slight increase in concentration now leads to
Fourth plane:	Apnœa, at first with no signs of circulatory depression. This rapidly passes into
Fourth stage:	Apnœa with circulatory depression; impending cardiac failure and death.

It will be seen that the depth of anæsthesia is reflected with great accuracy by the extent of depression of breathing, and this may be used as a more accurate and easily determined method of estimating the "plane level" during the third stage than an attempt to assess the degree of paralysis of the intercostal muscles. The exact points where intercostal paralysis begins and becomes complete (which mark the upper and lower limits of Guedel's third plane) are often impossible to determine in practice. More useful information can usually be obtained from observation of the breathing bag and manometer than from palpation of the chest wall.

The general phenomena of anæsthesia—loss of consciousness and reduction or abolition of the reaction to pain—are due solely to the action of the anæsthetic agent on the brain. Estimation of depth of anæsthesia as taught to generations of students, depends on the effect on the respiratory function. Muscular relaxation, in which the surgeon is more interested, appears to depend on diminution of skeletal-muscle tone as the centres in the C.N.S. become depressed; and in particular on depression of the anterior horn cells of the spinal cord, and suppression of stimuli normally reaching these cells from the cerebrum, cerebellum, basal ganglia, skin, joints and muscles (Beecher 1938, Yandell Henderson 1935a and b, 1937, Samson Wright 1940). As a rule cord-reflex arcs are suppressed early in the third stage of anæsthesia, but it is not always easy, at any rate with cyclopropane, to correlate the degree of depression of muscle tone with the degree of depression of respiratory activity. There is evidence that there may be variation, not only between anæsthetic agents, but also between patients (Magnus, R. quoted by Henderson 1933). With cyclopropane, apnœa may occur before relaxation—i.e., the respiratory centre may be paralysed before the cord-reflex arcs are depressed sufficiently to give relaxation—and it is important to prevent this.

The drug is certainly difficult to administer in cases where deep surgical relaxation is required. Diaphragmatic quietude is always present, and the rapid, panting, jerky movements which are such a source of embarrassment to the surgeon with ether are not seen. The peritoneum is always easily relaxed, and the intestines are not distended (as they are with the patient under nitrous oxide, which is apparently excreted into the intestinal lumen).

Animal experiment shows that with cyclopropane intestinal tone is increased and the gut is contracted, while the amplitude of contractions is reduced and propulsive movements abolished. (Peoples and Phatok 1935, Burstein 1938, Weisel et al. 1938). These signs may, however, be present with some degree of muscular rigidity, and to abolish this while keeping the cerebral concentration below apnœa level is not always easy. In my experience, this may most readily be accomplished with safety to the patient by the technique of slow induction presently to be described. This is facilitated by the reduction of preoperative sedation to a minimum.

Since the C.N.S. constitutes only about 5% of the total adult body-weight, the anæsthetic is distributed between a small bulk of tissue upon which it has physiological action, and a far larger bulk of tissues upon which it has

* Special valves which I have designed, modified from a pattern kindly supplied to me by Dr. Harris, and which are sensitive to very low minute volume respiratory exchange, do, I believe, closely satisfy these criteria.

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virtually none. Thus the concentration of the drug in the nervous system will be influenced by its solubility in the rest of the tissues. This buffering action of the body tissues delays both induction and elimination. With cyclopropane primary saturation †—that is, equilibrium between lungs, blood and brain—occurs quickly, at a time when concentration in other body tissues is minimal (Barbour 1936, Waters 1936, Robbins 1937). Thus it is possible to reach a brain concentration sufficiently high to cause apnœa, while the body tissues generally are almost completely unsaturated. With cyclopropane given in a completely closed system, after primary saturation has been reached a relatively high alveolar concentration must be maintained in order to keep the arterial tension at an anæsthetic level, since diffusion will gradually occur into the other body tissues. The extent of this diffusion can be estimated from finding of Orcutt and Seevers (1937) that the body fat will hold, under conditions of equilibrium, about seven times as much of this gas as the other body tissues.

TECHNIQUE

Induction.—The following considerations must be borne in mind about induction with cyclopropane:

1. Absence of irritation and rapidity of absorption in the central nervous system allow a smooth induction without respiratory stimulation and usually without excitement.

2. A high degree of respiratory depression can be easily induced at an early stage in anæsthesia, and indeed at any stage, but this bears no relation to the degree of muscular relaxation produced.

3. Depression of spinal cord reflex arcs (and hence muscular relaxation) can be achieved without the production of prolonged apnœas if the principles on which body saturation depends are remembered.

4. Until an appreciable body saturation has been built up, the absorbing capacity of the inert tissues is so great that it is often impossible to get relaxation without producing considerable depression of the respiratory centre, and even prolonged apnœa. This is by no means invariably safe.

5. The high oxygen content of the anæsthetic atmosphere is not incompatible with severe anoxæmia if pulmonary ventilation becomes inadequate.

For these reasons, I find a slow induction with small rate of flow of gas satisfactory, though this is contrary to the practice usually advocated (Bonham 1937, Griffith 1935, Rowbotham 1935). I continue with a flow of about 100 c.cm. per minute or less until respiration becomes almost imperceptible. The extra time required is not appreciable. Should apnœa occur at the end of this slow induction it is usually short and gives rise to no anxiety, for the fatty tissues, at this time relatively poorly saturated, provide a safety valve, and redistribution rapidly takes place. Alveolar concentration is maintained by a continuous trickle of a very small flow of gas, the object being to build up a concentration in the tissues which, while remaining below the apnœa level, will depress the motor system sufficiently to produce muscular relaxation. The bag should contain only enough gas to accommodate tidal respiration; it is better not to allow the breathing bag to become distended with an accumulation of gases of unknown relative composition (Burford 1936). Variation in the flow of cyclopropane or of oxygen then quickly shows itself in a lightening or deepening of the anæsthesia, collapse or distension of the bag; and maintenance of an even anæsthesia is facilitated. Manometric observations at the face-piece end of the apparatus show that distension of the bag unduly increases the pressure within the apparatus, thus increasing the load on the respiratory system.

Maintenance.—Redistribution of cyclopropane, its diffusion through the skin and rubber components of the apparatus, loss through the open wound and in blood spilt during the operation, and inevitable leakage, cause a progressive lightening of the anæsthesia. Inaccurate delivery of oxygen may enhance this effect. Unless the patient is closely observed the quiet breathing in all planes makes alteration in depth of anæsthesia easy to miss, particularly as, in ascending anæsthesia, eyeball movements do not always recur to mark the return of the first plane. There is a point in descending anæsthesia, at the upper part of the first plane, where vomiting may occur if the anæsthetic is not deepened rapidly; the breathing at this point is shallow. If the patient is allowed to reach this point again during ascending anæsthesia the breathing may become imperceptible or cease altogether, which leads to confusion with the third plane. Apart from alterations in respiratory volume, there is no satisfactory sign to warn against too light anæsthesia until the swallowing reflex becomes active, for muscular relaxation, once produced, does not always disappear at the same rate as the respiratory function recovers. Ascending anæsthesia may best be assessed by observation of the manometer attached to the breathing bag; this, in my opinion, should form an essential part of every closed circuit machine (Harris 1938).

Apnœa.—The high oxygen concentration possible with this anæsthetic gives the anæsthetist a feeling of confidence, and the ease with which apnœa can be produced, with associated stillness of the diaphragm, is very striking. To produce "controlled respiration" by inducing acapnia is easy; muscular relaxation, however, is not invariably produced by such techniques, nor can they be employed in every case without risk.

The possible harmful effect of the indiscriminate production of prolonged apnœas is illustrated by a fatality I have already reported (Gould 1939), and is supported by much experimental evidence. Robbins and Baxter (1937) found that during periods of apnœa in dogs, though the mixture in the breathing bag contained adequate oxygen, the arterial oxygen concentration rapidly fell. In a typical experiment, the arterial oxygen concentration fell from 20 vols. % to 2 vols. % during 20 minutes' apnœa.

Lengthy inadequate ventilation can bring about a state of anoxæmia, notwithstanding the high oxygen concentration in the apparatus, and considerable damage may be caused to the brain and heart. Gebauer and Coleman (1938) and Henson (1937) record cases of encephalopathy after cyclopropane due apparently to nerve-cell deprivation of oxygen, in spite of the high concentration of oxygen available. Schreiber (1939) and Courville (1939) have drawn attention to the untoward effects of unsuspected anoxia which may develop during anæsthesia unless careful and continuous observation is maintained. In shocked, cachectic, poor-risk patients, and those with decreased cardiac reserve production of apnœa is contra-indicated. Individual susceptibility and cardiac reserve are not invariably easy to assess before operation. By avoiding heavy preoperative medication, muscular relaxation can usually be produced by the slow-induction technique without the production of potentially dangerous apnœa.

COMPLICATIONS

Cardiac Irregularity.—The cause of the cardiac irregularities observed with this drug is obscure. Seevers (1934), Robbins and Baxter (1937) attributed their onset to the anoxia which may develop during apnœa. Anoxia undoubtedly plays a major rôle, but does not offer a complete explanation. Kurtz (1936), Meek and others (1937) and Eversole (1937) have described effects which they attribute to a direct toxic action of the drug on cardiac tissue. Robbins and Baxter (1937), and Robbins (1940a, b) describe these effects as invariably arising in animals when morphia is used as a premedicant, and less frequently when barbiturates are substituted. Intravenous injection of amytal abolished the bradycardia and arrhythmia which developed in their experimental animals at the time of, or soon after, respiratory arrest (Robbins, Baxter and Fitzhugh 1939). They conclude that morphine enhances, and barbiturates neutralise, the simulating effect of cyclopropane on the parasympathetic system (Robbins 1939, Adriani et al. 1940). These findings accord with clinical experience.

The exact significance of these cardiac irregularities cannot be assessed at present, but animal experiments support the clinical observation that, however produced, they disappear spontaneously as the anæsthetic concentration is reduced by increasing the oxygen concentration and improving the respiratory ventilation; and that

† The terms "primary," "secondary" and "tissue" saturation have unfortunately become identified with the technique described by McKesson (1926), who used the first term to signify "induction," and the others to describe his method of obtaining profound anæsthesia with nitrous oxide by producing a high degree of anoxæmia. The meanings are not to be so understood in the present paper.

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they leave behind no ill effects. They are not accompanied by circulatory deterioration, provided that hypo-oxidation is avoided. Histotoxic anoxæmia does not appear to be a complication of cyclopropane anæsthesia provided a sound technique is employed. The pulse must be continuously examined so that this condition can be recognised early, when it may be readily abolished by increasing the oxygen concentration. The use of adrenaline or other sympathomimetic drug should be avoided with cyclopropane (Orth et al. 1939, Meek 1940).

Excess Oxygen.—Cyclopropane is administered in an atmosphere of 70–80% oxygen. Beecher (1938) states that "there is no doubt that many of the toxic signs and symptoms elicited in man and animals by high oxygen concentrations are frequently seen after anæsthesia in which excess oxygen has been given," and concludes, "one may question the wisdom of administering high percentages of oxygen in anæsthesia for any length of time, at any rate to patients who are recumbent, cachectic, old or otherwise poor risks."

These toxic signs are said to include congestion of the lungs, with thickening of the alveolar walls and the presence of definite inflammatory changes, as shown by eosinophil cells therein (Haldane and Priestley 1935, Binet 1939, Behnke 1940). Horn 1938, Bonham 1939a, and Griffith 1938, have described cases of acute respiratory embarrassment resembling allergic phenomena and even acute pulmonary œdema in the course of cyclopropane anæsthesia; these have been attributed to the use of excessive concentrations of oxygen. In the light of more recent experience of oxygen therapy, however, there is some difficulty in justifying such statements. Boothby (1938, 1939), for example, has described the practice at the Mayo Clinic where oxygen in high concentrations has been administered to many patients every 3 or 4 hours for as long as four days, with intermissions of a few minutes only, without any evidence of pulmonary irritation.

The oxygen content of arterial blood is increased by only 10–15% as a result of inhaling 100% oxygen; this amount, though negligible where the circulation is normal, has a significant effect in preventing tissue anoxia and in improving the general condition of patients whose circulatory system is depressed by shock, cachexia or old age (Card et al. 1940). In my experience, cyclopropane, because of the atmosphere of excess oxygen with which it can be administered, is one of the most valuable anæsthetic agents we possess for such cases (cf. Frias 1939).

Postoperative Pulmonary Complications, though fewer than are usual with ether, were not entirely eliminated in my series. Apparently this has been common experience (Stiles et al. 1934, Moffitt 1936, Taylor et al. 1937, Schmidt and Waters 1935). The hope that lack of irritant properties in cyclopropane would materially reduce these complications was not founded on sound reasoning, for with spinal anæsthetics, for example, as with other types of local or regional anæsthesia, no direct irritation to the lungs can occur, and yet pulmonary complications are fairly common sequelæ. Pulmonary postoperative complications are probably due to a combination of prolonged depression of body tone and pulmonary atelectasis (Fine et al. 1938, Coryllos and Birnbaum 1932, Boland and Sheret 1928, Duff 1939, Burford and Jones 1938, Griffith 1934, Leuth 1938). Irritation of the lungs by the war gases produces œdema, a totally different pathological condition from that following operations. Spinal anæsthesia abolishes completely the tone in those parts of the body anæsthetised, and in many cases over the whole body, and this explains the frequency of pulmonary sequelæ. There is therefore little ground, if any, left for the belief once general, that irritation of the lungs by the vapour of ether or other volatile anæsthetics is the cause of pulmonary complications after inhalational anæsthesia. The underlying cause is atelectasis—alike after spinal, local, intravenous or inhalational anæsthesia—due to diminished body tone and subsequent collapse of the lungs (Yandell Henderson 1935a, b, 1936 and 1937, and Ayre 1938).

The improved postoperative condition of patients after anæsthesia with cyclopropane is due to the comparatively non-toxic nature of this drug; the ease with which depth of anæsthesia may be varied at will, so that profound muscular atonia is not maintained over long periods; and the rapid recovery of consciousness and body reflexes, accompanied by a similarly rapid recovery of muscular tone, which occurs unless operative shock has been severe. This rapid recovery, although always desirable (Harms 1939), sometimes proves embarrassing. After cyclopropane the prolonged stupor and inertia seen after the older anæsthetics does not occur. Displacement of nitrogen, however, is a real danger, and care must be taken before the anæsthetic is withdrawn, to restore a more normal alveolar atmosphere. Barach (1935a, b, 1936). Bonham (1939b), Eversole (1938) and Burford (1938) have suggested that helium, which is very slowly diffusible, should be added to the gas in the closed circuit machine. Helium though easily obtainable in America is difficult to obtain in this country, and I have been unable to get experience of this technique. Other precautions must be taken. The anæsthetic must not be withdrawn until the respiratory ventilation is again active and adequate. The lung bases may be aerated, the tone of the respiratory muscles increased and lost nitrogen be replaced to some extent at least, by the inhalation towards the end of the operation of a mixture of carbon di-oxide and air (not oxygen); often this may be continued with advantage for five minutes every hour, for some hours, during the recovery period. By these means the incidence of postoperative lung complications may be reduced.

CONCLUSIONS

The final assessment of cyclopropane as an anæsthetic has yet to be made. No attempt has been made to compare results of the 500 cases on which this paper has been based with those obtained with any other anæsthetic agent. In my opinion some hundreds of thousands of cases would be necessary in order to do this with any approach to accuracy, since conditions vary so much from hospital to hospital, surgeon to surgeon, and anæsthetist to anæsthetist. But some propositions may be formulated on the experience gained.

1. Cyclopropane produces a smooth induction without excitement, and quiet, even, breathing, with no irritation of mucous membranes. It is associated with a high oxygen content of the anæsthetic atmosphere which is of value in many cases.

2. Depth of anæsthesia is under direct and easy control, and muscular relaxation is usually excellent.

3. It produces safe anæsthesia without anoxæmia, carbon dioxide accumulation or irregular, struggling, respiratory movements, even in patients whose vital capacities are limited by disease. It is relatively non-toxic to body cells.

4. There is a rapid return of consciousness, of the cough and other reflexes, and of general body tone. Postoperative nausea and vomiting are decreased, and anæsthetic shock reduced. Compared with ether, the postoperative state is more pleasant to the patient and more satisfactory to the surgeon.

5. Many of the cases in this series were suffering from acute respiratory disease of one form or another, and the postoperative results in these cases were excellent—in most of them some form of local or regional analgesia was the only alternative.

6. Although the expense of cyclopropane and of its apparatus is greater than of other routine anæsthetic drugs, the saving in postoperative convalescence makes this worth while.

On the other hand, there are some drawbacks: the gas forms an explosive mixture with oxygen; there is more operative bleeding; and transient cardiac arrhythmias occasionally develop which, however, do not appear to be of great significance. The technique is complicated, and the drug is not one to be administered lightheartedly by the tyro. Close attention to detail is essential, and the margin of safety is probably less than with ether. The advantages of cyclopropane over ether, however, far outweigh, in my opinion, any possible disadvantages. It may be objected that theoretical considerations have been given a disproportionate place in this paper, but I believe that understanding of underlying principles must always precede practical advances.

Closer alliance of the anæsthetic departments of hospitals with the pharmacological and physiological

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laboratories is a development which has been long overdue.

I wish to thank the many surgeons with whom I have had the privilege of working during the past few years. Since some of the work which formed the basis of this paper was performed at various L.C.C. hospitals, I am grateful to Dr. W. Allen Daley for his permission to publish.

BIBLIOGRAPHY

Adriani, J., Martin, S. J. and Rovenstine, E. A. (1940) *Proc. Soc. exp. Biol. N.Y.* **45**, 785.
Ayre, P. (1938) *Brit. med. J.* **2**, 1279.
Barach, A. L. (1935a) *Anesth. & Analges.* **14**, 210.
— (1935b) *Ann. intern. Med.* **9**, 739.
— (1936) *J. clin. Invest.* **15**, 47.
Barbour, H. G. (1936) *Amer. J. Surg.* **34**, 435.
Beecher, H. K. U. (1938) Physiology of Anæsthesia, London.
Behnke, A. R. (1940) *Anesth. & Analges.* **19**, 1.
Binet, L. (1939) L'anoxémie, Paris.
Boland, C. R. and Sheret, J. E. (1928) *Lancet*, **2**, 111.
Bonham, R. F. (1937) *Texas St. J. Med.* **33**, 306.
— (1931a) *Anesth. & Analges*, **18**, 288.
— (1939b) *Ibid*, p. 54.
Boothby, W. M. (1938) *Proc. Mayo Clin.* **13**, 641.
— (1939) *J. Amer. med. Ass.* **113**, 477.
Burford, G. E. (1936) *Anesth. & Analges.* **15**, 254.
— (1938) *Ibid*, **17**, 241.
— Jones, O. R. (1938) *J. Amer. med. Ass.* **110**, 1092.
Burstein, C. L. (1938) *Proc. Soc. exp. Biol., N.Y.* **38**, 530.
Card, W. I., Smith, J. E., Griffiths, W. J., McSwiney, B.A. and Savage, B. (1940) *Lancet*, **1**, 398.
Coryllos, P. N. and Birnbaum, G. L. (1932) *Amer. J. med. Sci.* **183**, 327.
Courville, C. B. (1939) Untoward Effects of Nitrous Oxide Anesthesia, Los Angeles.
Duff, A. (1939) *Brit. med. J.* **1**, 190.
Eversole, U. H. (1937) *Surg. Gynec. Obstet.* **64**, 156.
— (1938) *J. Amer. med. Ass.* **110**, 878.
Fine, J., Hermanson, L. and Frehling, S. (1938) *Ann. Surg.* **107**, 1.
Frias, E. (1939) *Anesth. & Analges.* **18**, 1.
Gebauer, P. W. and Coleman, F. P. (1938) *Ann. Surg.* **107**, 481.
Gould, R. Blair (1939) *Anesth. & Analges*, **18**, 226.
Griffith, H. R. (1934) *Canad. med. Ass. J.* **31**, 157.
— (1935) *Anesth. & Analges.* **14**, 253.
— (1938) *Ibid*, **17**, 298.
Guedel, A. E. (1937) Inhalational Anesthesia, London, p. 25.
Haldane, J. S. and Priestley, J. G. (1935) Respiration, London, p. 354.
Harms, B. H. (1939) *Anesth. & Analges.* **18**, 150.
Harris, T. A. B. (1933) *Brit. med. J.* **2**, 1203.
— (1935) *Lancet*, **2**, 817.
— (1938) *Med. Pr. Suppl.* p. 9.
Henderson, V. E. (1933) *Amer. Med.* **39**, 2.
Henderson, Y. (1935a) *Lancet*, **2**, 178.
— (1935b) *Bull. N.Y. Acad. Med.* **11**, 639.
— (1936) *Amer. J. Physiol.* **114**, 261.
— (1937) *Anesth. & Analges.* **16**, 43.
Henson, C. W. (1937) *Ibid*, **16**, p. 349.
Horn, B. Van (1939) *Ibid*, **18**, suppl., p. 83.
Kurtz, C. M., Bennett, J. H. and Shapiro, H. H. (1936) *J. Amer. med. Ass.* **106**, 434.
Leuth, H. C. (1938) *Anesth. & Analges.* **17**, 229.
McKesson, E. I. (1926) *Proc. R. Soc. Med.* **15**, 57.
Meek, W. J. (1940) *Proc. Mayo Clin.* **15**, 237.
— Hathaway, H. R. and Orth, O. S. (1937) *J. Pharmacol.* **61**, 240.
Moffitt, J. A. and Mechling, G. S. (1936) *Anesth. & Analges.* **15**, 225.
Orcutt, F. S. and Seevers, M. H. (1937) *J. Pharmacol.* **59**, 206.
Orth, O. S., Leigh, M. D., Mellish, C. H. and Stutzman, J. W. (1939) *Ibid*, **67**, 1.
Peoples, S. A. and Phatok, N. M. (1935) *Proc. Soc. exp. Biol., N.Y.* **33**, 287.
Robbins, B. H. (1937) *Anesth. & Analges.* **16**, 93.
— (1939) *J. Pharmacol.* **66**, 206 ; 216.
— (1940a) *Ibid*, **68**, 85.
— (1940b) *Arch. Surg., Chicago*, **40**, 1044.
— and Baxter, J. H. (1937) *J. Pharmacol.* **61**, 162.
— — Fitzhugh, O. G. (1939) *Ann. Surg.* **110**, 84.
Romberger, F. T. (1935) *J. Indiana med. Ass.* **28**, 18.
— (1937) *Ibid*, **30**, 288.
Rowbotham, S. (1935) *Lancet*, **2**, 1110.
Schreiber, F. (1939) *J. Mich. med. Soc.* **38**, 1050.
Seevers, F. H., Meek, W. J., Rovenstine, E. A. and Stiles, J. A. (1934) *J. Pharmacol.* **51**, 1.
Stiles, Neff, W. B., Rovenstine and Waters, R. M. (1934) *Anesth. & Analges.* **13**, 56.
Taylor, I. B., Bennett and Waters (1937) *Ibid*, **16**, 187.
Waters (1932) *Ibid*, **11**, 97.
— (1936) *Brit. med. J.* **2**, 1013.
Weisel, W., Youmans, W. B. and Cassels, W. H. (1938) *J. Pharmacol.* **63**, 391.
Wright, S. (1940) Applied Physiology, Oxford.

EXTENSION OF TEMPORARY REGISTER.—Up till now an overseas doctor could only obtain temporary admission to our medical register if he was by law entitled to practise in his own country, and doctors who had passed the necessary examinations but were debarred from practice by racial or other legislation were thus unable to obtain temporary registration here. A new defence regulation and a new order have now been made and a doctor may now register if he is : of good character ; holds a medical diploma (or has passed the examinations for the diploma) recognised by the G.M.C. ; has been appointed as a medical officer in an approved hospital or as an assistant to a doctor on the permanent register. Registration does not affect an alien's obligation to comply with the aliens acts and orders.

GASTRO-COLIC FISTULA COMPLICATING DIABETES MELLITUS

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(From an E.M.S. Hospital)

CASES of gastro-colic fistula are not often reported. Verbrugge (1925) collected 202 cases from the literature ; Poynton and Macgregor (1930) collected 250 cases and reported 1 case. Fairley and Kilner (1931) reported 3 cases, Mindline and Rosenheim (1935) a case and Bennett and Hardwick (1940) reported another. The case reported here occurred in a diabetic, causing serious difficulties, and it illustrates a technique for the management of a diabetic patient in preparation for a serious abdominal operation and in after-treatment.

CASE-HISTORY

A male civil servant, aged 52, was admitted to hospital on March 20, 1940, in diabetic coma. He was semi-comatose, breathing deeply, in severe ketosis and with a blood-sugar of 0·46 mg. per 100 c.cm. For 6 years prior to admission he had been a known diabetic and had been fairly easy to stabilise ; 18 months before admission he had undergone a gastro-enterostomy for a gastric ulcer ; thereafter he had been well until a month before admission, when one evening after dinner he felt a sudden severe abdominal pain which continued until the next day ; it left him with diarrhœa which persisted with occasional exacerbations up to the time of admission. Owing to his abdominal discomfort and liability to diarrhœa he had become erratic in his diet and at times had had severe hypoglycæmic attacks. Before the pain and diarrhœa began he had been stable on 20 units of zinc protamine insulin and 20 units of ordinary insulin daily, but since then the dosage had had to be greatly reduced ; indeed, for the 2 days before admission he had had no insulin at all.

In hospital there was a satisfactory response to insulin, dextrose and intravenous saline, and after a week he was receiving a 1400 calorie diet and in 3 weeks a 2100 calorie diet with three doses of 10 units of ordinary insulin daily. On this diet his morning blood-sugar was high, so his evening dose of insulin was increased to 20 units. He then developed a severe nocturnal hypoglycæmic attack. At the same time the diarrhœa increased and he lost weight. The diarrhœa now became persistent, especially at night, and he had nocturnal hypoglycæmic attacks in which he sweated profusely and became extremely violent and disoriented. On May 10 the insulin had had to be reduced to 5, 10 and 5 units. It was clear that there was a relation between the severity of the diarrhœa and of the hypoglycæmia ; presumably owing to failure to absorb carbohydrate. The stools were greyish, with a fatty sheen suggesting the presence of fatty-acid crystals. On the history and these observations a diagnosis of gastro-colic fistula was made with some confidence.

Pathological and radiological examinations.—Blood : red cells 4,700,000 ; Hb. 75% ; white cells 11,600 ; no abnormal cells. Serum-calcium 8·8 mg. ; plasma-phosphorus 2·8 m.g. ; blood-chloride 420 mg. per 100 c.cm. Fractional test-meal : some increase in free and total hydrochloric acid. Urinary diastase-index 10. Stools : total fat 59·3% of dried fæces, free fatty acid 23·9%, neutral fat 9·1%, soaps 26·3%.

Dr. E. E. Holdsworth reported the presence of a gastro-colic fistula after a barium enema, the results of a barium meal being inconclusive.

Preoperative treatment.—Since the patient appeared to be somewhat dehydrated and no reliance could be placed on his power of absorbing carbohydrate by mouth, it was decided to administer 150 g. of dextrose daily intravenously by slow drip, and to cover it with appropriate amounts of insulin. At 10 P.M. on May 11 infusion was begun, the solution consisting of three parts of 5% dextrose solution and one part of normal saline ; the rate of flow was 30 drops per min., and 5 units of insulin was injected into the lumen of the tube near the cannula every 2 hrs. On the 13th the blood-sugar was 0·15 mg. at 11 A.M. The infusion was continued until 1.45 P.M. and the operation was begun at 2.30 P.M. Until that morning fluids were allowed freely by mouth in order to wash the stomach and intestine. The patient's general condition immediately prior to operation was good.

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First operation.—Preliminary medication, 1 c.cm. of Omnopon and hyoscine (Roche); gas and oxygen anæsthesia. There was slight tissue œdema and a little clear fluid in the peritoneal cavity. At the site of the previous gastro-enterostomy there was a large anastomotic ulcer, adherent to the colon near the splenic flexure, which had ulcerated through into the colon. The colon and small intestine were clamped and dissected free, the anastomosis and fistula being opened. The edges of the opening into the stomach and the small and large intestine contained dense ulcer tissue which was cut away. The colon was repaired by transverse suture and a piece of omentum was stitched over the suture line. The edges of the openings in the stomach and small intestine were dissected free of ulcer tissue and the anastomosis was reconstituted. The patient stood the operation well and intestinal peristalsis continued throughout.

At 6 P.M. 200 c.cm. of 10% dextrose solution and 4 units of ordinary insulin were given intravenously and a similar amount at 9 P.M. On May 14 at 11 A.M. 250 c.cm. of 10% dextrose with 4 units of insulin were given intravenously and thereafter 3½ oz. of milk and 3½ oz. of water were given by mouth and 10 units of insulin were injected, followed by similar amounts 2-hourly with 2 units of insulin. On the 15th 7 oz. of milk with 6 units of insulin were given 4-hourly; thereafter solid food was added until, on May 21, he was receiving 2100 calories with ordinary insulin units 30, 25, 20. On the 28th analysis of stools showed total fat 36·5%, free fatty acid 4·9%, neutral fat 8·7%, soaps 22·9%. The total blood-calcium was 12·1 mg. and plasma-phosphorus 4·2 mg. per 100 c.cm. There was thus a substantial postoperative improvement in the condition of the bowel in relation to the absorption of fat, calcium and phosphorus. Recovery was uneventful, and the patient was discharged on June 8 on the same diet with insulin 20 units daily and zinc protamine insulin 30 units daily.

Progress.—After his discharge he felt well and was at work until the beginning of November, 1940, when one morning on his way to work he experienced severe mid-epigastric pain which then moved down to the umbilicus. The pain often recurred at irregular intervals not directly related to meals; it was relieved by food and alkalis. At times it radiated round to the back; it was aching in character and varied in intensity. There was no nausea and no vomiting. His diabetic condition remained unchanged, and he was stable on 20 units of zinc protamine with 20 units of ordinary insulin every morning. He was readmitted to hospital on Nov. 4, 1940. The sudden reappearance of the pain suggested that the repair operation had broken down. The stools were examined and showed a total-fat content of 31·2%, free fatty acid 11·36%, neutral fat 8·25%, fatty acids combined as soaps 11·6%. Blood: red cells 5,600,000; Hb. 96%; white cells 17,300 (polymorphs 71%). Thus, since May 28, the stools had become almost normal, and the red cell count normal, although no iron had been administered. Together these findings indicated considerable improvement in absorption. A barium enema was administered, and Dr. M. H. Jupe reported the presence of a gastro-entero-colic fistula.

In contrast with his condition on his first admission, he was in good general health, and little extra preparation was required before operation. On Dec. 2 he had his usual breakfast, with 10 units of ordinary insulin, and 10 units of zinc protamine insulin (half his usual dosage); he had his usual dinner, an easily digestible meal, at noon. At 2 P.M. his blood-sugar was 0·33 mg., and he received no further solid food; he was given 2 oz. of glucose in ½ pint of orangeade, with 4 units of insulin, at 2 P.M. followed every hour by a similar amount of orangeade and glucose until 10 P.M. In view of the high blood-sugar revealed at the 2 P.M. test, 12 units of insulin were given at 4 P.M.; blood-sugar at 5.30 P.M. was 0·29%, so a further 24 units of insulin was given at 8 P.M. Nothing but water was given by mouth after 10 P.M. At 9 A.M. on Dec. 3 the blood-sugar was 0·22 mg. An intravenous drip of 10% dextrose was given at the rate of 30 drops per min. until 2.30 P.M. Blood-sugar at 1·30 P.M. was 0·25 mg. This fulfilled our desire to maintain the value rather high in view of the anticipated severity of the operative measures necessary.

Second operation.—This was carried out at 3 P.M. Premedication was again 1 c.cm. of omnopon and hyoscine and the anæsthetic gas and oxygen. A mass of adhesions was found to be matting the splenic flexure of the colon to the posterior aspect of the previous gastro-enterostomy. The gastro-enterostomy was displayed by separating the adhesions. The adjacent portions of the gut forming the fistula were divided, exposing the lumens of the portions of the tract involved—the jejunum with a small part of the stomach and the splenic flexure of the colon. The colon was clamped with light clamps some distance from the opening, later two more clamps were applied closer to the hole. An ulcer could be palpated in the wall of the colon on the distal part of the splenic flexure, and resection was considered essential. Some 5 in. of colon were excised and with some difficulty the two ends of the bowel were brought together and an end-to-end anastomosis performed. The original gastro-enterostomy was repaired, the edges of the orifice were excised, and the edges sutured with continuous catgut and then inverted with a continuous seromuscular Lembert suture.

Immediately after the operation the patient showed signs of shock, and a pint of normal saline was administered intravenously followed by a pint of citrated blood. He rallied satisfactorily, and his subsequent progress was uneventful. The postoperative regime was similar to that after his first operation. A barium enema on Jan. 7, 1941, showed the colon to be large but without any defect in it. On Dec. 20 his serum-calcium was 10·4 mg. and serum-phosphorus 3·5 mg. per 100 c.cm. Blood-sugar estimations 2-hourly on the day before his discharge showed a slight nocturnal rise on 25 units of zinc protamine insulin and 10 units of ordinary insulin, so he was discharged on a dosage of 30 units zinc protamine insulin and 15 units of ordinary insulin each morning, his diet consisting of 2100 Calories. He was discharged on Jan. 18, 1941, having gained 13 lb. since his operation.

DISCUSSION

One seldom has an opportunity of treating a case of gastro-colic fistula so soon after its occurrence. Indeed, in this case, but for the concomitant diabetes and the consequent upset in insulin balance, it might have remained unsuspected for some time.

Various authors (Verbrugge 1925, Strauss 1921, Castle et al. 1930, Camp 1930, Poynton and Macgregor 1930, Fairley and Kilner 1931, Mindline and Rosenheim 1935, Benker and Hammett 1939, Bennett and Hardwick 1940) have drawn attention to the clinical features of the condition. The symptoms are usually those of ulceration, either simple or malignant, of the stomach followed in the former case by gastro-enterostomy and subsequent anastomotic ulcer, and in the latter by direct spread by intestinal ulceration. The patient may complain of foul eructations (in our case this symptom was elicited only by inquiry), of loss of weight although the appetite is good, and of diarrhœa, there being sometimes as many as 10–12 motions in the 24 hours. The bowels tend to act 2–3 hours after food and often at night. The changes in the stools (Strauss 1921) are an early feature. Fairley and Kilner (1931) have found that in both sprue and gastro-colic fistula there is usually excess of fat in the stools and that it is well split. In our case this was so before operation, but afterwards the stools returned to normal. Various other authors (Castle et al. 1930, Strauss 1921, Fairley 1930) have recognised the similarity between the findings in sprue and in gastro-colic fistula, and have noted a low blood-calcium and anæmia, usually megalocytic, in both; but in gastro-colic fistula there is usually a high gastric acidity while hypochlorhydria is usual in sprue. Our patient had a moderate hypochromic anæmia with no abnormal cells; this disappeared after operation without any iron other than in the food; gastric analysis showed hyperchlorhydria.

The importance of radiographic examination was emphasised by Strauss (1921) who said that gastro-colic fistula may sometimes be discernible only by barium enema. This was confirmed in our case, for the barium meal was indeterminate, whereas the enema left no room for doubt, and on the second admission a clear result was obtained by enema alone.

We would call attention to the ease and convenience of the continuous infusion of dextrose in fairly large amounts, together with insulin injections, as means of securing a satisfactory blood-sugar level with complete absence of ketosis. The solution used was not normal saline solution with added dextrose, which would have tended to raise the salt content of the body unduly, but normal saline mixed with either 5 or 10% dextrose in water so as to form an isotonic solution.

Our thanks are due to Dr. Greenfield and his staff for the biochemical estimations.

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A CASE OF POLYRADICULONEURITIS

WALLACE BRIGDEN, M.B. CAMB.
LATELY HOUSE-PHYSICIAN AT SUTTON EMERGENCY HOSPITAL

THE case of polyradiculoneuritis described here made an unusually rapid recovery. The disease appeared to be intermediate in type between the acute febrile form of Holmes and the Guillain-Barré syndrome as exemplified in the East Anglian epidemic described by Stuart Barber.[1]

A previously healthy, well-nourished man, aged 30. A fortnight before his first nervous symptoms he had a sore throat which he believes was unaccompanied by fever; from this he recovered in a few days. Weakness and pain in the calf muscles, followed rapidly by numbness and weakness in the arms, heralded the paralytic stage. Walking became impossible 3 days later. He was then admitted to hospital and was found to have reduced power in both arms, the left being more affected than the right. With the exception of the right triceps jerk all tendon reflexes were absent. Thoracic muscles were normal, but the superficial abdominal reflexes were absent. Both legs were in flaccid paralysis with all tendon reflexes absent, but the plantar reflexes were extensor. His calf muscles were tender. There was no proprioception from great toe movement, and some loss of epicritic sensation over a small area on the lateral aspects of both ankles; otherwise sensation was unimpaired. There was persistent tachycardia and slight enlargement of the heart. The cerebrospinal fluid was under pressure, and showed considerable rise in protein and no increase in cells. The Wassermann reaction was negative. During the next 3 days the facial muscles and recti abdominis, except in the right upper quadrant, became completely paralysed and speech was slurred, and on the fourth day it was noted that the left lower intercostals were involved. Blood-sedimentation rate 73 mm. in 1 hour. White cells 12,200 (polymorphs 77%, lymphocytes 18%). This marked the maximum extent of the paralytic process, which remained stationary for a further week, at the end of which the B.S.R. had improved to 56 mm. in 1 hour, and white count to 11,200 (polymorphs 69%, lymphocytes 30%). From this time the facial and intercostal muscles regained normal power in about a fortnight, while there was a general improvement in muscle tone; for some days stroking the sole produced a flexor response of the whole limb with extended toes. During this recovery phase the B.S.R. progressively fell, by the end of the fourth week reaching only 12 mm. in 1 hour; the white blood-cells were now 6000 (polymorphs 64%, lymphocytes 33%). In the next few days the abdominal muscles regained their power, the hamstrings and recti femora became almost normal, and proprioception returned. Tachycardia subsided during the fifth week. Seven weeks after admission he was able to stand and no signs of abnormality in the nervous system other than an indefinite plantar response on the left side were obtainable. Normal walking soon followed. B.S.R. fell to within normal limits, but there was a slight unexplained rise in leucocytes.

Intramuscular injections of 10,000 units of vitamin B_1 were administered daily for 10 days, and a third of this dose for a further 10 days. No indications of vitamin deficiency existed before his illness, and it is doubtful whether this treatment helped in his rapid recovery. Physiotherapy was given to the limbs for 2 weeks before he began to walk.

In this patient the pathological process spread from the motor roots and anterior-horn region to involve the upper motor neurone, and in view of the slight sensory impairment other tracts were possibly also affected. The rapidity of recovery suggests that the condition was due to no more than an inflammatory œdema or the diffusion of a locally produced toxin. The raised B.S.R. and leucocytosis favour the infective theories of its origin, but differ from the findings in Stuart Barber's cases; resemblance was found on examination of the C.S.F. In other cases reported the B.S.R. was either normal or not investigated. This man responded well to the unknown noxious agent; this probably produces a generalised metabolic disturbance of which paresis may be only one aspect. The intensity of the patient's response may have been related to the rapidity and completeness of his recovery.

I am indebted to Dr. Louis Minski for permission to report the case.

1. *Lancet*, 1940, **2**, 548. The differential diagnosis, ætiology and pathology of the disease are discussed in Barber's paper.

DR. ANDERSON AND OTHERS: REFERENCES

Benker, W. H. and Hammett, L. E. (1939) *Bull. Johns Hopk. Hosp.* **64**, 215.
Bennett, T. I. and Hardwick, C. (1940) *Lancet*, **2**, 381.
Camp, J. D. (1930) *Radiology*, **15**, 274.
Castle, W. B., Townsend, W. C. and Heath, C. W. (1930) *Lancet*, **1**, 1062.
Fairley, N. H. (1930) *Trans. R. Soc. trop. Med. Hyg.* **24**, 131.
— and Kilner, T. P. (1931) *Ibid*, **2**, 1335.
Mindline, J. and Rosenheim, M. L. (1935) *Ibid*, **2**, 764.
Poynton, F. J. and Macgregor, J. V. (1930) *Lancet*, **2**, 240.
Strauss, H. (1921) *Berl. klin. Wschr.* **58**, 661.
Verbrugge, J. (1925) *Arch. Surg. Chicago*, **11**, 790.

Reviews of Books

Doctor and Difficult Child

WILLIAM MOODIE, M.D. St. And., F.R.C.P., D.P.M., medical director, London Child Guidance Clinic and Training Centre. London: Humphrey Milford, Oxford University Press. Pp. 214. 8*s*. 6*d*.

THE Commonwealth Fund of America is to be congratulated on this publication; in these days of shortage and "ersatz" it is a joy to get hold of a book so beautifully bound and printed. Nor are the contents less pleasing; from his vantage as a pioneer of child psychiatry in this country, Dr. Moodie has surveyed the whole range of problems which a child is likely to present to its harassed parents or teachers. The book could be used as a manual of practical advice, not only to doctors, but to anyone who deals with children and their problems. The author has all the good Scots belief in hard work and sound education, and the danger is that the tyro may suppose that it is all as easy as it looks. "The education of neurotic or so-called 'nervous children' needs special care," says Dr. Moodie. "They require to be kept interested and encouraged to make an effort. They must not, on any account, be driven. Education has special value for them because it utilises the mental energy which is behind their nervous symptoms, and at the same time it gives them things to think about and so directs their thoughts from themselves and their fears." But having led the horse to water, how to make him drink? Mechanisms are not dealt with in detail, and the book should be read less as a textbook in child psychiatry than as a pleasant account of the way in which many problems in childhood can be sensibly approached and satisfactorily treated.

Practical Biochemistry for Students of Medicine

(4th ed.) A. T. CAMERON, D.Sc. Edin., F.R.S.C., and FRANK D. WHITE, Ph.D. Edin. London: J. and A. Churchill. Pp. 246. 9*s*. 6*d*.

FIVE years separate the new edition of this approved Manitoba manual from the previous one; but the authors have made but few innovations, preferring, as they state, to keep the old tested methods as far as possible. However, an account of the micro-Kjeldahl estimation has been introduced, and also the estimation of ascorbic acid and Fearon's test for citrulline. A possible weakness of this book is the rather scanty section on the blood pigments; while for the estimation of phosphate in urine the use of cochineal as internal indicator might be preferred to the external use of ferrocyanide. Strong points are the excellent section on alkali reserve, the introduction to liver function tests, vitamins and hormones, and the instructions for the handling and standardisation of quantitative apparatus.

Catechism Series: Surgery

(5th ed.). Edinburgh: E. and S. Livingstone. Pp. 70. In two parts, each 1*s*. 6*d*.

Part 1 deals with the general aspects of surgery such as infections, hæmorrhage, shock and gangrene, and diseases of bone. Part 2 embraces fractures, dislocations and diseases of joints. It is surprising what a wealth of information is contained in these necessarily compressed accounts; and for what they are—unashamedly examination cram-books—these slight volumes are commendably up to date and informative. The introduction of X-ray photographs is a useful new feature; most of these have reproduced sufficiently well to be of value to the student but some (notably Paget's disease of the tibia and the benign giant-cell tumour) should be strengthened or replaced in the next edition.

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THE LANCET

LONDON: SATURDAY, OCTOBER 18, 1941

HOSPITALS FIRST

ON Thursday of last week, in reply to a question in the House of Commons (see p. 466), the Minister of Health outlined the Government policy on the hospital service after the war. It is the objective of the Government, he said, to ensure that appropriate treatment shall be readily available to every person in need of it. This task will be laid on the major local authorities, whose duty it will be to secure a comprehensive service by placing on a more regular footing their existing partnership with the voluntary hospitals. But the design of the service is to be based on areas larger than counties and county boroughs, in order to include in each a teaching hospital or other such centre in which the more highly specialised services can be provided. Patients will be expected to make a reasonable payment, whether by contributory schemes or otherwise, towards the cost of their treatment, the remainder being borne by the local authority or the voluntary hospital with the assistance of an Exchequer contribution. Teaching hospitals are to have increased educational grants. Such in broad outline is to be the sequel to the Emergency Hospital Scheme which came into being just two years ago. It will not surprise those who have read the PEP report of December, 1937 ("The hospital problem is essentially regional . . ."), or have followed attentively the devoted labours of the Nuffield Provincial Hospitals Trust, with Sir FARQUHAR BUZZARD as adviser, which have familiarised the country with a scheme of hospital reorganisation based on regional units. Mr. ERNEST BROWN in announcing his project for an immediate survey of hospitals in Greater London acknowledges the valuable preliminary work done by the trust outside the metropolis. He spoke of three stages in orderly progress: consultation between all concerned, which has already taken place; then the survey; and afterwards the working out of the scheme—"of course," he added, "with the approval of the Ministry." But he did not specify who is to control the new regionalised hospital scheme—no doubt the right sort of independent corporation will be found when the time comes—and he flatly declined to consider a general national health service or the future of the medical profession as a whole; "that is," he said, "of course a wider question, and the hospital service must be considered first."

There are several reasons why the course of post-war hospital policy may be smoother than could have been foretold two years ago. The state, as Mr. C. E. A. BEDWELL reminds us,[1] has now undertaken to replace the damage done to parent hospitals by air-raids, and the satellite hutments of 1939–41 are more attractive than those of 1914–18 with the result that "patients like them." Some recent voluntary hospitals have cost £1000 or more a bed, but a 40-bed hutment can be provided for £70 a bed. One world-famous British hospital spent its first thirty years happily in the hutments of an even earlier war-period. Mr. BEDWELL, reviewing the ground covered by the PEP report, speaks of the "silent revolution" in the hospital service effected by the Local Government Act of 1929. Under its de-rating clauses the million sterling grant from the Exchequer to voluntary hospitals (promised in 1924 and later repudiated) was more than handed over to the county councils to help them meet their dual obligation: to provide hospital beds for all, and in so doing to consult the voluntary authorities. Since then the hospital wagon has been drawn by a team which begins to look like a span. Following London's admirable example, under the tutelage of Sir FREDERICK MENZIES, local authorities all over the country are increasing their payments to voluntary hospitals for services rendered, under a wide variety of agreements; in the darkening valley their paths have drawn closer during the last two years. The ideal area for hospital administration is also the ideal one for all sorts of public-health work and presumably for other large-scale public activities. That conviction, stated in these columns [2] when the Ministry of Health began to intervene, has only been strengthened by what has happened since. But it may well be true, as Mr. BEDWELL suggests, that local authorities might be more easily reconciled to the surrender of their hospital control to a regional authority if they could retain their general care of the public health, for which a personal knowledge of the needs of the people and of their manner of living is essential. At all events Hospitals First is the watchword, and we may be well content that the Government has committed itself to consultation, survey, preparation and settlement of a comprehensive scheme.

1. *Quarterly Review*, October, 1941.

LYSOZYME

IN spite of the successes of the sulphonamides and acridines, and lately of penicillin, the demand for local antiseptics is not yet satisfied. For some years the Russians have been investigating the possibilities of lysozyme. FLEMING,[3] its discoverer, gave this name to a class of enzymes possessing the power of dissolving a variety of micro-organisms. These enzymes are almost universally distributed in animal tissues and body fluids. They are found particularly in saliva, serum and tears, and, of the solid tissues, cartilage, but curiously enough they are absent from the cerebro-spinal fluid. High concentrations are found in white of egg. Pure lysozyme was isolated by ROBERTS [4] and crystallised by ABRAHAM and ROBINSON [5]; it is a readily diffusible protein of low molecular weight which is rather more soluble in fats and oils than in saline and water. FLEMING clearly established that its physical properties were those of an enzyme. It is not, for instance, used up in the course of bacteriolysis; it operates on bacteria over a narrow range of pH in the neighbourhood of neutrality, and it is inactivated in neutral or alkaline solution by moderate heat. The substrate of lysozyme (the substance on which it acts) was thought by HALLAUER [6] to be a glyco-protein, while MEYER and his colleagues [7] showed that reducing sugars were split off from the bacterial substrate during the course of digestion.

2. *Lancet*, 1939, **2**, 939.
3. *Proc. roy. Soc.* B, 1922, **93**, 306; *Lancet*, 1929, **1**, 217.
4. *Quart. J. exp. Physiol.* 1937, **27**, 89.
5. *Nature*, 1937, **140**, 24.
6. *Zbl. Bakt.* 1929, **119**, 240.
7. *J. biol. Chem.* 1936, **113**, 303.

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These facts were reconciled by EPSTEIN and CHAIN,[8] who showed that lysozyme, like "spreading factor," is a carbohydrase, and that lysis of bacteria takes place when the products of hydrolysis, like the purified substrate, are soluble in water. It is probable that the substrate has protein attachments in the bacterial envelope, and that lysis in addition to antisepsis—an important distinction first made by EPSTEIN and CHAIN—occurs only when the conditions of digestion are such that the bacterial proteins dissolve in the digestion fluid. Thus, as NAKAMURA[9] first observed, a mere adjustment of pH may bring about the "flash lysis" of bacteria which are structurally unaffected by the enzyme.

There are serological differences between samples of lysozyme from different sources,[10] but all alike digest the purified substrate in vitro. The test organism since universally used for examining the action of lysozyme was isolated by FLEMING from nasal mucus and named by him *Micrococcus lysodeikticus*. He found that three-quarters of more than 100 airborne microbes studied, including bacilli, yeasts and moulds as well as cocci, were susceptible to lysozyme; but some classes of bacteria, notably the coli-typhoid group, are totally resistant to its action. A striking fact is that *Brucella abortus* and *Bacillus pseudotuberculosis rodentium* are moderately susceptible: these, FLEMING writes, "are culturally and serologically identical with *Micrococcus melitensis* and *B. pestis* respectively, both of which . . . are very pathogenic for man, and for which there is apparently no lysozyme in the human secretions. It may be that it is in this sensitiveness to a human lysozyme that the difference between these microbes lies." Unfortunately it is chiefly, though not entirely, on the non-pathogenic organisms that lysozyme acts; the determining factor, EPSTEIN and CHAIN point out, is whether or no the enzyme substrate is present in the bacteria. *B. anthracis*, for instance, is destroyed though not dissolved by lysozyme. Many organisms may in fact be non-pathogenic because of their susceptibility to lysozyme. Moreover, FLEMING found that by exposure to lysozyme bacteria may acquire, and maintain during cultivation, a resistance to its action. Thus RIDLEY observed that lysozyme-resistant survivors from an originally innocuous strain of staphylococci had acquired, with their resistance, the power of producing keratitis when injected into the cornea of rabbits.

There are, then, serious limitations to the powers of lysozyme as an antiseptic, and there is still another difficulty to be faced if lysozyme is to be given by injection or applied to raw vascular surfaces. This is that in such circumstances lysozyme will act as an antigen, and the recipient may find himself sensitised to the foodstuffs which contain the enzyme. So far egg-white has been the only practicable source of lysozyme in quantity. Treatment with this "foreign" lysozyme might sensitise the patient to eggs, though not to other animal foodstuffs since their lysozyme is serologically different, and the antigenic effect would not be destroyed by ordinary cooking. This objection, however, will not apply to the application of lysozyme to the eye or unbroken serous surfaces. For the last ten years YERMOLJEVA, BUJANSKAVA and their colleagues in Russia have been examining the possibility of using lysozyme in surgery. In the short review[11] they published in 1938, before purified lysozyme was available for their use, they reported encouraging results in the treatment of corneal ulcers, in the general surgery of the eye and elsewhere. How far these applications can usefully be extended remains to be seen.

8. *Brit. J. exp. Path.* 1940, **21**, 339.
9. *Z. ImmunForsch.* 1923, **38**, 425.
10. Roberts, E. A. H., Macgraith, B. G. and Florey, H. W. *Quart. J. exp. Physiol.* 1938, **27**, 381.

HEALTH AND THE JOB

DOCTORS are usually fair-minded people but if their outlook has a bias it may be said that it points naturally and justifiably, like the needle of a compass, towards the interests of their patients; for when someone comes for help and advice it would only be a churlish fellow who did not respond to the compliment and do his best. Not all doctors, however, realise the weight that medical certificates carry nor how great an influence the medical profession in the aggregate can exert on the war effort. Workpeople know that doctors are ready to help them in their troubles and they are accustomed to seek medical certificates to support their physical and psychological objections to doing night work, an unpleasant job, or working in a particular factory controlled by the Essential Work Order. Many such objections and applications are genuine and the medical certificates are rightly issued after adequate deliberation by the medical men. If however the doctor states, in good faith but without first-hand knowledge, that the factory conditions or processes are detrimental to the worker's health, his certificate goes beyond his experience. In the Sheffield district, for example, the process of grinding has a bad name because the dust from the sandstones which were used in the past gave rise to grinders' rot or silicosis. Nowadays nearly all sandstones have been replaced by artificial abrasive wheels made of non-siliceous materials and grinders on the whole are no longer exposed to the risk of silicosis. Other processes go by the name of grinding such as "precision grinding" in the manufacture of machine tools. The grinding is often done by a diamond point from which little or no dust arises, and in all cases the work is either done wet or under exhaust ventilation. But in Sheffield grinding is still grinding (in the same way as pigs is pigs whether guinea or otherwise) and therefore dangerous to health—and this folk-lore is apt to be reflected in doctors' certificates. Such lack of knowledge or discrimination, if it is not checked, can have a deleterious influence on the output of essential war material. On another page a letter from a works manager illustrates this point.

When a doctor is confronted by a worker who asks for a medical certificate stating that his work is endangering his health, he would do well to bear in mind that such a certificate cannot justifiably be given unless he knows both the worker's state of health and the conditions of his work. The doctor can take his choice between going to look at the job the worker has been doing, getting in touch with the works medical officer (if there is one) and discussing the case with him, or consulting one of H.M. medical inspectors of factories who are stationed in London, Birmingham, Bristol, Sheffield, Leeds, Manchester and Glasgow,

11. *Acta med. U.R.S.S.* 1938, **1**, 248.

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and are always ready to advise on occupational health risks in general or on the processes of a particular factory.

TEMPORARY IMMUNITY AGAINST INFLUENZA

WHILE we await the development of a trustworthy method of active immunisation against influenza, the temporary protection conferred by immune sera is not necessarily to be despised. Such evidence as there is suggests that the prospects of achieving a local passive immunity are hopeful. SMORODINTSEFF [1] reported promising results from the inhalation of finely dispersed immune horse-serum, but full details are not available. TAYLOR [2] has lately described the results of experimental studies on influenza A virus infection of mice. A single dose of immune ferret serum administered intranasally to mice protected them against virus introduced by the same route 24 hours later; even after 48 hours some protection was given. Serum applied intranasally after virus infection achieved much less, but there was a definite effect, if the interval between infection and administration of serum was not greater than 6 hours. Intranasal serum was in all experiments far more effective than intraperitoneal, apparently because it achieved a high antibody concentration at the spot where it was most needed. There must be some danger from producing sensitisation by administering foreign sera intranasally to human beings, but convalescent human sera should be available quite early in an epidemic and methods of quickly estimating the potency of these are known. Even temporary protection of key persons would often be worth while. For instance, as often happens, if father and the children are all down with the 'flu and mother is looking after them, much would be gained if she could be protected during the difficult period by sniffing antibody once or twice daily. But further work is needed to establish that TAYLOR'S findings can be applied to war, and it has yet to be decided whether the effect could be best achieved by instillation of liquid or by using snuff or a fine spray. A great attraction of the sniffing technique is that it could be applied not only to influenza A—the variety of influenza most troublesome in recent years—but perhaps to other virus infections also. It may be that pandemic influenza is due to neither of the known viruses, A and B. We may one day be faced with a devastating scourge such as that of 1918–19, with little hope that laboratory studies can provide a remedy in time. Prophylactic application of convalescent serum to the nasal passages might then prove a godsend, capable of being put into effect even by those isolated from centrally organised help.

1. Smorodintseff, A. A. *Proc. 3rd int. Congr. Microbiol.* 1939, p. 375.
2. Taylor, R. M. *J. Immunol.* 1941, **41**, 453.

THE new crop of war-blinded are reaching St. Dunstan's. Captain Sir Ian Fraser, chairman of the executive council, finds them more serious minded than their forerunners of the last generation. They are quick learners in walking about wards and classrooms, and many have already passed the exacting tests in braille reading and typewriting expected of them, and have begun to share in the indoor and outdoor games and recreations open to them, including cards, dominoes, tug-of-war, rowing, tandem cycling (presumably with a seeing partner), acting, music and dancing. "Recovery of sight," Sir Ian writes in the twenty-sixth annual report, "is impossible for many, but recovery from blindness is the rule."

Annotations

SOURCES OF VITAMIN C

ONE of the most striking changes in our diet since war began has been the fall in the consumption of fruits. Few raspberries, strawberries and blackcurrants have been obtainable this summer outside the districts where they are grown, and the large supplies of fruit which could normally be expected for winter and spring—oranges, lemons, grapefruit, bananas and the wide variety of canned fruits—have been greatly restricted.[1] These fruits are mainly of dietetic importance for their vitamin-C content. Holmes, Pigott and Tripp [2] point out that, on an average, 110 ml. of orange, grapefruit or lemon juice will supply the 50 mg. of ascorbic acid which the adult probably requires daily. The importance of these citrus fruits in normal times lies not only in their high antiscorbutic value but also in their relatively low cost as sources of vitamin C,[3] and alternative cheap sources of the vitamin are therefore needed. Andross [4] has collected some useful information on the vitamin-C value of wild fruits, and has tested jams, juices and puree made from wild rose hips, elderberries, wild raspberries, cranberries, bilberries and crab-apples. Of these fruits wild rose hips alone seem to be worthy of practical consideration as antiscorbutics. Pezold [5] in Germany quotes values ranging from 500 to 1100 mg. of ascorbic acid per 100 g. of wild rose fruit. He also discusses the effect of various methods of presenting hips in an edible form and urges the importance of picking the fruit before they are over-ripe when they lose something like half of their vitamin-C content. He considers that during the winter months responsibility for vitamin-C intake must lie largely with the jam manufacturer, for he found that jam is one of the most effective ways of preserving the hips. He also strongly recommends hip wine, but this might be an impractical suggestion for this country where the commercial preparation of fruit wines is not so common as in Germany. Here the housewife has been rediscovering the tastiness of hip marmalade and hip jelly, and hips are being collected on a large scale by women's institutes, schools, boy scouts and girl guides. It is hoped to convert some 500 tons into syrup. The picking organisations are to receive 2*s*. per 14 lb. for the fruit, so that it should be possible to sell the syrup at a reasonable price. Among our cultivated fruits we have a rich source of vitamin C in blackcurrants, and the Ministries of Food and Health have reserved a significant proportion of this year's crop in the form of puree and juice for young children. But the supply of vitamin C for older children and for adults too must be considered. Olliver [6] reports that, in the spring of this year, cooked green vegetables provided almost all the vitamin C in the diet of test subjects, and that one 4 oz. helping of freshly cooked green vegetables could supply the total daily requirement of the vitamin. Root vegetables, such as potatoes, may be valuable antiscorbutics when freshly harvested, but are poor sources of the vitamin in the spring owing to loss on storage. The consumption of green vegetables in the late winter and spring is obviously to be encouraged, provided the material is properly handled. Olliver's experimental work emphasises the need for the careful cooking of vegetables and shows that about half the vitamin C is destroyed after the vegetables have been kept hot for only 40 minutes. These results, together with the recent summary by the Medical Research Council [7] of the best methods of preparing

1. *See* Widdowson, E. M. and Alington, B. K. *Lancet*, Sept. 27, 1941, p. 361.
2. Holmes, A. D., Pigott, M. G. and Tripp, T. *New Engl. J. Med.* 1941, **225**, 68.
3. Olliver, M. *Lancet*, 1940, **2**, 190.
4. Andross, M. *Analyst*, 1941, **66**, 358.
5. Pezold, F. *Dtsch. med. Wschr.* 1941, **133**, 897.
6. *J. Soc. chem. Ind. Lond.* 1941, **60**, 586.
7. *Lancet*, 1941, **1**, 838.

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green vegetables for the table, should be impressed on housewives and caterers, and especially those who are responsible for feeding large numbers of children.

PELLAGRA IN SPAIN

THE unhappy Spanish war led to malnutrition of which the extent can be inferred from the numerous clinical papers on vitamin deficiency in Iberian journals. Thus in the second number of the new *Acta Española Neurologica y Psiquiatrica* there are three articles based on only too rich an experience. B. Llopis has studied 118 cases of psychosis due to pellagra, from the initial to the final stages; he reports endogenous as well as organic syndromes, and has observed four stages in the disorder—neurasthenia, apathy, oneiroid confusion and, finally, profound disturbance of consciousness, which are respectively akin in his judgment to mental fatigue, going to sleep, light sleep and deep sleep. The psychological content of these syndromes is derived from organic disturbances of sensation, which are localised, and the translation of which into hallucinations can be clearly traced in the patients, facilitated as it appears to be by the clouding of their consciousness. Llopis devotes the greater part of his paper to a review of the significance of this for psychopathology. From Madrid, J. Marquez Blasco and M. Peraita contribute two papers on the capillaries and the skin temperature in this disorder. During the autumn and winter of 1937, they state, a great part of the civil population of Madrid showed a syndrome, essentially of pellagrous nature, characterised chiefly by paræsthesiæ; a smaller group, more gravely affected, showed the "rich and singular symptomatology" of a pellagra syndrome in which burning pain, similar to causalgia, was prominent. The authors decided therefore to see what part the capillary system played in these causalgia-like phenomena; they used the clinical material of Llopis, and of Jimenez Garcia, as well as Peraita's own cases—56 in all, with neurological disturbances in all but 6. Absolutely normal capillaroscopic findings were never found, but 54% of the cases were in the main normal in this respect, and in 18% the picture was quite abnormal. The capillary changes increased as the illness went on, and were related to neurovegetative disturbances. There did not appear to be any connexion between the type of capillary anomalies and the presence or absence of cutaneous and mental symptoms. They found, in 40 subjects whose cutaneous temperature was measured, that there were in the extremities many departures from the normal (the readings being lower, as was to be expected from the frequency with which these patients complained of coldness in the extremities) whereas in proximal zones, such as the forehead, normal readings were obtained. The vasomotor control was investigated in 6 of the cases and in 5 of them judged abnormal, the response to immersion of the arm in warm water being either delayed or incomplete.

CYCLICAL CHANGES IN HUMAN ENDOMETRIUM

THE unique activities of the glandular cells of the endometrium during the menstrual cycle have been further investigated in Dublin by O. E. Aykroyd and J. Brontë Gatenby.[1] Taking advantage of recent advances in histological technique they have been able to show a remarkable series of changes in the Golgi apparatus and paraplasmic inclusions, corresponding to different phases in the cycle, which they divide into the proliferative, progravid, menstrual and postmenstrual periods. At menstruation the Golgi apparatus suddenly disperses while much of the cell contents is thrown into the lumen. But the Golgi apparatus of the basalis portion of the endometrium, which is not shed, undergoes a similar change. During recovery the fragments of Golgi apparatus are gathered into a transverse line parallel with the free margin of the cell, producing thus a palisade effect when a row of cells is viewed, though there is no evidence of any intercellular connexion between adjacent pieces of the apparatus. During the proliferative phase (lasting from the fifth or sixth day to the fourteenth day after menstruation) the Golgi apparatus reforms into the usual net-like arrangement lying near the nucleus and remains thus for the remainder of the cycle. In this proliferative phase no sudanophil fat is found within the cells, but droplets appear on a small scale early in the progravid phase (fifteenth to twenty-eighth day) and thereafter increase. This fat becomes greatly exaggerated if pregnancy supervenes; in menstruation it is shed into the lumen. These changes in the Golgi apparatus are interpreted by Aykroyd and Gatenby as representing the preparation of the apparatus for the active production of a solid, probably proteid, secretion related to early pregnancy. This secretion, appearing in the form of cytoplasmic droplets stainable with Heidenhain's iron hæmatoxylin, is increased in the cells in early pregnancy and is a feature of diagnostic help in the histological examination of curettings from a suspected case of interrupted pregnancy. The physiological significance of this secretion seems to be unknown. It would be useful to know if it is also present in association with other conditions giving a positive Aschheim-Zondek test.

1. *Quart. J. micr. Sci.* June, 1941, p. 541.

CHEMOTHERAPY IN TUBERCULOSIS

SUBSTANCES which have been administered to the long-suffering patient in the vain hope that they would destroy the tubercle bacillus without first destroying him are enumerated by Calmette as follows: salts of calcium, gold, silver, bismuth, copper, and the rare earths of the ceric group; formic aldehyde, benzyl alcohol, xylol and the creosote series, iodine and its compounds, dyestuffs, and the fatty acids of chaulmoogra and cod-liver oil. Even this list is by no means complete. Gold has had the best press, and still has its disciples—and martyrs. During the last five years a new school has arisen, as was inevitable, to try out the sulphonamides, and a large number of papers has been published recording experiences of administrations to patients and experiments in vivo with laboratory animals and in vitro with various strains of tubercle bacillus on different culture media. Lately Feldman and Hinshaw[1] in America have noted a definite modification and retardation of the expected course and character of experimental tuberculosis in guineapigs receiving sulphapyridine, though they encountered unpleasant results on the mucosa of the digestive tract. Feldman and Karlson[2] also tested it on rabbits infected with avian tubercle bacilli, but with unsuccessful results. Heise and Steenken[3] encountered similar disappointments with guineapigs, and noted that the growth of the tubercle bacilli was not entirely inhibited by sulphapyridine introduced into the culture media even in concentrations of 80 mg. per 100 c.cm. Flippen, Forrester and Fitz-Hugh[4] confirmed these negative findings, and it looks as though another chapter of failures has been closed. A variant of these chemotherapeutic experiments has been made by controlling the oxygen. Saz and Bernheim[5] set out to find a substance which would inhibit extra oxygen intake, the drug known as 2:3:5-triiodobenzoate being selected. With this compound in very low concentration inhibition of growth was obtained on culture media. It is tolerated by rats and guineapigs, and man can take it by mouth without apparent ill effects—and absorb it from his gastro-intestinal tract. Apparently it can inhibit growth without destroying cells. The difficulties of all this work are obvious. Not only is the chemo-

1. Feldman, W. H. and Hinshaw, H. C. *Amer. Rev. Tuberc.* 1940, 41, 732.
2. Karlson, A. G. and Feldman, *Ibid*, 1940, 42, 146.
3. Heise, F. H. and Steenken, W. jun. *Ibid*, p. 801.
4. Flippin, H. F., Forrester, J. S. and Fitz-Hugh, T. jun. *Ibid*, p. 821.
5. Saz, A. K. and Bernheim, F. *Science*, 1941, 93, 622.

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therapist faced with the task of damaging the bacilli without damaging tissue cells, which is common to all work of this kind, but he has to encounter two additional obstacles. In the first place the histological tubercle is avascular, and quite early in its development has a zone of protective collagenous fibres around it. Secondly, the waxy envelope of the tubercle bacilli is a law unto itself. Even in a test-tube it is difficult to destroy, and attempts to do so in living tissues, with drugs of known potency in capsule destruction, such as sulphapyridine, have not been conspicuously successful. A new method of approaching the problem has now been devised by Emmart and Smith,[6] with an ingenious technique for cultivating the tubercle bacillus on the chorio-allantoic membrane of the chick embryo. In this way they are able to obtain tubercles within 4–6 days of implantation, and to make cytological studies of the reactions to the different cultures used. This method may enable the chemotherapist to obtain what he has long been wanting —a rapid picture of the tissue reaction to a drug in tuberculosis.

"SPONTANEOUS" RUPTURE OF THE SPLEEN

THERE have been about 20 reports in the last 20 years of spontaneous rupture of the normal spleen, and though not all of them bear scrutiny there are a few careful records under this self-contradictory title. Rupture of the spleen is a known if rare complication of malaria and typhus fever and it is not unknown in typhoid or indeed in almost any disease where the spleen is enlarged. In this country it is usually caused by trauma and the aeroplane and motor-car have done much to increase its incidence. Of more immediate interest are those instances of delayed rupture where a patient receives a blow but after a short time appears normal and may even return to work only to collapse several hours or days later with serious internal bleeding. The cause of delayed rupture is not certain but it is believed that the original splenic tear is quickly sealed by coagulation or omentum and that the bleeding starts again when this plug is dislodged. Another possibility is that the original injury produces a subcapsular hæmatoma with subsequent pressure necrosis, softening of the pulp and erosion of fresh and large vessels. In spontaneous rupture such delayed effects of trauma must be excluded and adequate histological examination of the spleen must be made before the diagnosis can pass muster. Thus King's[7] case-report of spontaneous rupture in infectious mononucleosis, which contains one of the few detailed descriptions of the pathological findings in that disease, is not in the accepted sense spontaneous since the spleen was greatly enlarged. In Hamilton Bailey's[8] list of 71 recorded cases it is noted that in 4 no microscopical examination of the spleen was made, and in 1 it was said to be apparently normal. Nor is it wise to stake all on a casual or even a categoric denial by the patient of a blow and Hamilton Bailey's view that the spleen cannot be ruptured without the patient remembering the knock is certainly open to question. Workers in industry often receive blows which are capable of causing grave injury but are quickly forgotten if they do not involve immediate incapacity for work. The time factor is important and a case-record by Hohenwallner[9] opens the question of just how long a delayed rupture of the spleen may be delayed. Hohenwallner's patient was struck on the chest on Sept. 2 but after a short rest he recovered and went on working until Jan. 3 when he was found to have abdominal bleeding from an old tear in the upper pole of the spleen. That the injury received four months previously caused the rupture and the later illness seems evident and the implications both to the practice of traumatic surgery and to the theory of spontaneous rupture are obvious. It may be that sometimes neither trauma nor any known change in structure plays a part in the so-called spontaneous rupture of the spleen but if the cause is unknown it is better to avoid euphemistic terms like "spontaneous" and say so plainly when we do not know.

6. Emmart, E. W. and Smith, M. *Publ. Hlth Rep. Wash.* 1941, **56**, 1277.
7. King, R. B. *New Engl. J. med.* 1941, **224**, 1058.
8. Bailey, H. *Brit. J. Surg.* 1930, **17**, 417.
9. Hohenwallner, J. *Zbl. Chir.* 1938, **65**, 1910.

AN APPOINTMENT IN SUSPENSE

THE Dudley town council has affirmed by 15 votes to 13 its decision to suspend its medical officer of health, Dr. W. A. McLennan, for the duration of the war. Its sole reason is that, being obliged by law to register for military service, Dr. McLennan registered as a conscientious objector in the manner prescribed by law. There is no suggestion that he is incompetent; on the contrary, his efficiency has been publicly acknowledged. The Government, and indeed the Minister of Labour and National Service himself, long ago deprecated any victimisation of those whose conscience leads them to follow a course which the law expressly permits. The borough is depriving itself of a key officer of recognised ability and experience at a moment when these qualifications are particularly important and when replacement must be made from a limited field and from relatively inexperienced applicants. It can hardly be supposed that this aspect of the most profitable use of medical man-power can have escaped the attention of the Minister of Health. It is understood, however, that he has hitherto found himself unable to convey to the town council of Dudley any suggestion that its decision should be reconsidered.

UROLOGICAL COMPLICATIONS OF CERVICAL CARCINOMA

ALL gynæcological textbooks lay emphasis on urological complications as a cause of death in carcinoma of the cervix, but a thorough urological investigation is often omitted in such cases except when obvious symptoms focus the surgeon's attention on the urinary tract. Anatomically, this tract is most vulnerable to carcinoma of the cervix in its lower reaches—in the bladder and the pelvic portions of the ureter, notably where they traverse the base of the broad ligament. Lesions of the urethra, the abdominal part of the ureter, or the kidney are secondary findings caused either by advanced malignancy or by back pressure from ureteric obstruction. Renal metastasis is rare, and was seen only once by T. F. Todd[1] among over 1000 cases of carcinoma cervicis. The incidence of involvement of the lower urinary tract can be judged from his statement that he saw bladder involvement in 110 cases at their first attendance; whereas the rectum, that other close neighbour of the cervix, was involved only once in all cases prior to treatment. The growth first invades the muscle wall, causing circulatory changes in the mucosa, and next spreads forwards into the mucosa, finally ulcerating and producing a vesico-vaginal fistula. Cystoscopy, and cystoscopy alone, can diagnose these bladder changes in their early stages. The mucosa is at first congested and distorted; there is transverse ridging of the base of the bladder, with isolated hillock formation, and later bullous œdema and finally ulceration. These last two phenomena place the patient in stage IV of the League of Nations classification. The importance of this cystoscopic examination is that in 195 cases clinically assessed as stage III no less than 44 showed involvement of the bladder in Todd's series—a clinical error of 20%. The prognosis in these cases is thus gravely affected by the urological investigation. It is not, however, only as a diagnostic and prognostic procedure that cystoscopy is of value, but also in the urological complications of treatment. These are twofold: recurrent malignant disease in the bladder,

1. *J. Obstet. Gynæc.* June, 1941, p. 334.

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not differing in appearance from that of the untreated case and therefore self-evident on examination; and postradiation ulceration—quite a different entity. In Todd's series postradiation ulceration was rare; he saw only 10 cases in 5 years, and of these only 4 proceeded to the stage of ulceration, the remaining 6 showing merely a telangiectatic atrophy of the vesical mucosa. The ulcers were all situated above the interureteric bar, and had suspicious heaped-up edges and a surrounding zone of bullous œdema; the adjacent mucosa was blanched, with scattered telangiectatic spider-web patches; the ulcer was occupied by a slough. Treatment is expectant, and in 3 of the 4 cases the ulcer healed spontaneously with a scarred bladder base. The diagnosis of the radio-necrotic ulcer is made on the cystoscopic appearance and the absence of any definite malignant lesion. For the malignant ulcer there is no treatment. Todd divides ureteric complications into three groups: those occurring in untreated cases, and those following surgical and radiation treatment. In the first group he investigated 90 cases before treatment by retrograde or intravenous pyelography. Two of these 90 were in stage I and had no urological complications; among 26 in stage II he found hydronephrosis in 3. Among 32 in stage III he found hydronephrosis in 5 and a functionless kidney in 3 and poor renal function in 1; and among 30 cases in grade IV 10 showed hydronephrosis and 9 a functionless kidney. In many of these cases the blood-urea, investigated as a routine before treatment, was within normal limits. In a follow-up of his cases with urological complications in the upper urinary tract, Todd found that the prognosis was particularly gloomy. Post-radiation complications of the upper urinary tract are not uncommon in patients investigated months or years after treatment, and Todd places the figure as high as 50% in a small series that he investigated. The lesion noted was some form of ureteric obstruction, but whether the cause was actual stenosis from growth or fibrosis he declined to decide.

TROUBLE WITH TRIGONELLINE

THE assessment of nutritional status is gradually being placed on a quantitative basis. Thanks largely to the work of Leslie Harris and his collaborators at Cambridge, methods have been evolved of estimating the level of nutrition in respect of certain water-soluble vitamins. They found that people with recognisable vitamin deficiency—for example, with scurvy—excreted much less of the vitamin in the urine than did people on diets well provided with it.[1] The "saturation" tests evolved by these investigators made it possible to determine the amount of (say) vitamin C which it was necessary to administer as "test doses" before the excess overflowed in the urine. By comparison with subjects known to be receiving optimal amounts of the vitamin it became possible to determine with some degree of accuracy the deficit of the vitamin in subjects who were only mildly below standard and who had no obvious clinical manifestations of scurvy. Such tests have since been used extensively for assessing[2] the nutritional level of vitamin C and, more recently,[3] of vitamin B_1. Since the discovery and identification of nicotinic acid as the pellagra-preventing vitamin, many workers have elaborated methods for estimating it in the urine, in the hope of developing a saturation test for detecting its deficiency. It is now possible to determine the amount of the vitamin excreted with some degree of accuracy, and several investigators have already found that the "resting" excretion—i.e., in the absence of test dosing—is diminished in deficiency of this vitamin.[4] It was recognised, though, that test dosing would probably give a better indication of deficiency than the simple determination of resting levels. Some workers, for example, suggest that there may be overlap in the resting excretions, so that normal subjects occasionally excrete less nicotinic acid than subjects who are deficient.[5]

The question of test dosing is however complicated by the fact that ingested nicotinic acid is excreted in the urine partly as such and partly as other conjugated or degradation products, the most important of which is trigonelline. The excretion of trigonelline, which is biologically inactive, is also affected by factors other than nicotinic-acid intake, being especially increased by substances rich in trigonelline such as legumes. But provided the diet is free from trigonelline, it has been shown independently by workers both in America[5] and in Cambridge[6] that the resting excretion of trigonelline is diminished in deficiency, and this diminution may be more considerable than that of the nicotinic acid itself. The Cambridge workers have also devised an accurate method for estimating trigonelline, which previously has only been determined semi-quantitatively. They suggest that the saturation technique (in which the vitamin is given and the excretion of trigonelline measured) provides a better measure of antipellagra status than the measurement of the resting level of excretion; the amount of trigonelline derived from the controlled diet will be insignificant compared with the much larger quantities produced from the test doses of the vitamin. On the other hand, should it be impossible to arrange for the controlled diet and for the test dosing, the estimation of nicotinic acid in the urine is to be preferred to that of trigonelline, since nicotinic acid is derived from the vitamin alone, whereas trigonelline may be derived from biologically inactive substances in the diet. It will be of interest to see further results in this field, particularly since it has been suggested that nicotinic-acid deficiency may play a part in the causation of Vincent's angina and of some types of stomatitis as well as in pellagra-like dermatitis.

Dr. THURNAM, whose death at the age of 71 is announced in another column, was one of Dr. Otto Walther's early patients at Nordrach and on his return from the Black Forest founded on the Mendips the first sanatorium to be run on Nordrach lines. Walther remained almost unknown in his own country and it was his British and American patients who brought to light the robust open-air treatment which he initiated and introduced a new era in open bedroom windows.

1. Harris, L. J. and Ray, S. N. *Lancet*, 1935, **1**, 71.
2. Harris, *Ibid*, 1940, **2**, 259.
3. Wang, Y. L. and Harris *Biochem. J.* 1939, **33**, 1356.
4. Harris and Raymond, W. D. *Ibid*, p. 2011; Kühnau, J. *Klin. Wschr.* 1939, **18**, 1333; Rosenblum, L. A. and Kühnau *J. Biol. Chem.* 1940, **134**, 1; Naganna, B., Giri, K. V. and Venkatesam, P. *Ind. med. J.* 1941, **76**, 208.
5. Field, H., jun., Melnick, D., Robinson, W. D. and Wilkinson, C. F. jun. *J. clin. Invest.* July, 1941, 379.
6. Kodicek, E. and Wang, *Nature*, July 5, 1941, p. 23.

ANGLO-SOVIET MEDICAL COMMITTEE.—An executive committee has now been appointed to carry out the plans of the Anglo-Soviet Medical Committee formed on Sept. 10 (*Lancet*, Sept. 20, p. 344). At a meeting of the executive on Oct. 8, with Sir Alfred Webb-Johnson the president, in the chair, there was progress to report: 26 doctors have volunteered to help with translations and the Society for Cultural Relations with Russia have handed over all their medical literature to the committee. A new task to be undertaken is that of advising lay organisations on the purchase of medical supplies for the U.S.S.R. Sir Alfred considered that the committee should accept responsibility for giving such advice but should not be responsible for making purchases or arranging shipments. Mr. Somerville Hastings said that the Welsh miners had raised £60,000 for this purpose, and that his advice had been sought about its disposal. Lord Dawson and Lord Horder suggested that the committee should work with the joint Red Cross in this matter. A subcommittee was appointed to explore the situation and give advice.

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Special Articles

RADIUM THERAPY IN WAR-TIME

M. LEDERMAN, M.B. LOND., D.M.R.E.
RADIUM THERAPIST, ROYAL CANCER HOSPITAL (FREE)

W. V. MAYNEORD, D.SC. BIRM., F.INST.P.
PHYSICIST TO THE HOSPITAL

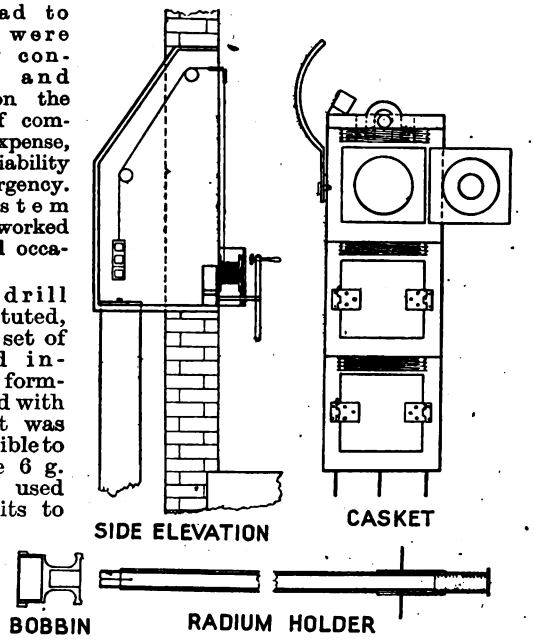
AT the outbreak of war radium therapy was one of the few branches of medicine the practice of which seemed inadvisable, if not impossible, under the anticipated conditions of warfare. Not only is radium very costly, so that the loss of any large quantity would prove a serious financial problem to any hospital or doctor, but in the event of the destruction of radium-containing apparatus by bombing the scattering of the contained radium salt might render the site of disaster dangerous until the dispersed radium could be recovered. Should recovery not prove possible the scattered radium salt would retain its radio-active properties for centuries and constitute a possible danger to workers undertaking clearance of the site or erection of new buildings, or to future inhabitants of the buildings.

The scattered radium salt is harmful inasmuch as its entry in the form of radio-active dust into the body, by inhalation or ingestion, results in radium poisoning,[1 2] a condition which should not be confused with the effects of the therapeutic use of radium, wherein the body tissues are exposed to the radiations from radium and its products. After entry into the body radium behaves in a manner comparable to lead, being carried in the blood-stream and either excreted, or deposited in the bones, bone-marrow, liver, lungs and spleen. The rate of elimination is at first rapid but quickly diminishes with the passage of time. After a year any radium in the body is to all intents and purposes fixed. The clinical phenomena associated with radium poisoning are chronic, and arise from the fixed radium which acts by producing an alpha-particle bombardment of the tissues in which it is deposited. Usually no harmful effects are noticed until years after the entry of the radium into the system. That the osseous and hæmopoietic systems suffer chiefly is shown by the occurrence of bone necrosis, radiation osteitis, spontaneous fracture and osteosarcoma. Changes in the blood are usually in the form of regenerative anæmia of the myeloblastic or pernicious type, in contrast to the anæmia secondary to excessive gamma radiation, which tends to be aplastic. Colwell and Russ [2] say: "It has been estimated that 10 microgrammes of radium distributed over the whole skeleton would be sufficient to produce a horrible death, years after it had been ingested. So far as we can see, radium is thus the most deadly poison known; tetanus toxin had, we believe, previously held the record with a lethal dose of 0·22 mg."

PROCEDURE AT THE ROYAL CANCER HOSPITAL (FREE)

At the outbreak of war the radium stocks of the Royal Cancer Hospital, in common with those of several other London hospitals, were buried in a specially constructed borehole extending to 50 ft. below ground, at which depth the radium was considered safe even from a direct hit by a large calibre bomb. At the end of November, 1939, however, it was possible to resume to a restricted extent the use of radium in the treatment of patients. Two of the three existing teleradium units (one 5 g. and one 1 g.) were put into commission and 0·5 g. of radium in the form of tubes of various denominations was made available for use in surface radium and gynæcological applicators. The third teleradium unit possessed by the hospital was so constructed that the radium, once in place, could not easily be removed.

In order that the radium in these units could be quickly buried in case of air attack a second borehole (see figure) was constructed immediately outside the teleradium treatment room, which is situated on a second floor approximately 30 ft. above ground level. A steel tube 70 ft. long was sunk 40 ft. into concrete, the remaining 30 ft. just reaching the sill of a window of the treatment room. By removing the window and building a small cage outside, a radium table was formed just reached by the steel tube. A simple wooden sliding door and steel plate which could be locked in position normally closed the top of the hole. A special casket having three compartments and suspended from a steel hawser acted as a container for the radium. The doors of the casket were so designed as to be closed and locked in position very quickly and securely. The three compartments were used for 5 g., 1 g., and radium tubes respectively. A winch and series of pulleys completed the apparatus needed for raising and lowering the radium to and from the place of safety. Several more complex systems involving motor-driven hauling gear and pneumatic transference from bomb-head to borehole were carefully considered and rejected on the grounds of complexity, expense, and unreliability in an emergency. The system chosen has worked well on all occasions.



A.R.P. drill was instituted, a suitable set of rules and instructions formulated, and with practice it was found possible to return the 6 g. of radium used in the units to the casket and to lower it out of sight in 15 sec. About 45 sec. sufficed to lower to the bottom of the borehole, the speed of the casket being controlled by pressure on the rim of the wheel of the winch. The radium was lowered on the sounding of an alert and at the completion of treatments at the end of each day. Special holders were designed to aid in the rapid removal of the radium from the unit to the borehole.

Until September, 1940, cancer of the skin and cancer of the uterus were treated by the appropriate types of applicator without any serious restriction. For insertion into the tissues radon needles have been used at all times, though recently (June, 1941) some radium needles have been put into use. Owing to the continual air attacks on London in September, 1940, it was found advisable to abandon temporarily the use of radium in the form of surface or intravaginal applicators, but treatment by teleradium continued without interruption. The net effect of the day and night air-raids has been to restrict the number of cases treated, but in recent months it has been found possible to return once again to normal standards.

The treatment of skin cancer and cancer of the uterus by radium was resumed early in October, 1940. Radium applicators were employed for the cases of skin cancer. The quantities used were relatively small, only one patient was treated at a time and treatment was always carried out during daylight hours. As the patient was kept in a ward near the radium department these applicators could be quickly removed and transferred to the borehole when the occasion demanded, a special compartment being available in the casket. The position with regard to intra-uterine and intravaginal applicators was rather different. Continuity of treatment is important and the rapid removal of the applicators presents difficulties. To remove applicators of this type every time a warning was sounded, or to use radon instead of radium, would have made treatment impracticable, for transfer of the radium to a place of safety could not be effected quickly (that is, in less

1. Evans, R. D. *Amer. J. publ. Hlth*, 1933, **23**, 1017; *Amer. J. Roentgenol.* 1937, **37**, 368; Aub, J. C., Evans, R. D., Gallagher, D. M. and Tibbetts, D. M. *Ann. intern. Med.* 1938, **11**, 1443.
2. Colwell, H. A., and Russ, S. X-ray and Radium Injuries, London, 1934, p. 178.

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than 2 min.) and meanwhile a large quantity of radium would have been exposed to danger. Secondly, radon supplies in the quantity necessary to treat any appreciable number of these cases are not readily or regularly available. To meet this situation the following arrangements were made. Not more than 90 mg. of radium was ever left in use during an air-raid and the patient with intravaginal and intra-uterine radium was kept in a room by herself in the safest part of the hospital—the ground floor of a modern five-storey ferroconcrete building. Responsibility for the safety of the radium was allocated in the event of enforced evacuation of the hospital, and rules formulated for other relevant emergencies. In the circumstances it was felt that the chance of dissemination of radium salt enclosed in a double metal container and placed within the deep parts of the female pelvis were small even should the hospital sustain a direct hit, since only complete disintegration of the patient would cause loss of the containers and even then there was a reasonable chance of the metal containers remaining intact.

PROTECTION OF PERSONNEL

Normally the conditions under which radium work is carried out are the subject of special and stringent recommendations laid down by international agreement. Protective measures are taken to ensure that no radium worker receives radiation in excess of a certain minimum quantity (0·2 r. per day) which is considered to be consistent with safety to general health. It was obvious, of course, that repeated exposure to large quantities of radium under abnormal conditions imposed by the need for speedy removal of the radium to a place of safety meant that the staff responsible for this work ran the risk of receiving a dose of radiation greater than that considered safe. By calculation and direct measurement it was found that the amount of radiation received by the staff still lay below the "tolerance dose," the average daily dose received by those taking part in the transference being about 0·1 r. The special means adopted to ensure the maximum of safety under the new conditions were therefore briefly:

1. Speed. Rapid removal of the radium serves to reduce the time of exposure to a minimum.
2. Distance. The radium containers are kept as far as possible from the body during transference.
3. Careful check is kept on the amount of radiation received during the duty periods of the members of the radium department. An ionisation chamber is normally carried by each person employed in radium work at this hospital, and this check now becomes doubly important.
4. Distribution of the risk among as many individuals as possible. Initially a rota consisting of 8 members of the radium and physics departments was employed; but it was soon found possible to divide this work among fewer people without harmful result.

As the result of the experience of eighteen months we have no reason, either clinical or physical, to question the effectiveness of the methods employed from the point of view of protection of personnel.

WAR AND THE PATIENT

At various times since the outbreak of war patients requiring treatment by radium have undoubtedly suffered and some have even lost their lives as a result of the impairment of the facilities normally available during peace-time. Patients undergoing radium treatment at the Royal Cancer Hospital at the outbreak of war had to be discharged, and, although it was found possible to recommence the treatment by X-ray therapy of some of these cases several weeks later, the remainder who could not be so treated have succumbed to their disease and the outlook of those who restarted was considerably affected. For the first five months of the war no cases of cancer of the uterine cervix were treated by radium at this hospital. With the possible exception of stage-1 cases, it is doubtful whether either of the alternative methods of treatment (surgery or X-ray therapy) can satisfactorily replace radium in the treatment of every type of case, so that the patients treated by these methods during the period in question must be considered as having had inferior treatment.

The dispersal of population either as a result of deliberate evacuation to other parts of the country or migration to other parts of London because of air-raids, the shelter-life led by many patients of the hospital class since September, 1940, and the bombing of hospitals and temporary disorganisation of civilian medical practice have had the result that new cases coming for treatment are less numerous. It was rare, for a time, to see a hospital patient with an early lesion in certain body sites (buccal cavity, pharynx, cervix). In the two years preceding the war the number of early cases of disease in these situations attending for radium treatment had shown an encouraging increase, and there seemed reasonable hope that this was because the importance of early diagnosis and treatment was being realised by both patient and doctor. If so, the war has largely nullified the work of years of careful and persistent propaganda just when tangible results were forthcoming.

In normal times a waiting-list can be kept down to an unavoidable minimum, but since the outbreak of war the number of beds available for cancer cases at this hospital has had to be reduced with the result that the waiting-list has increased. Although during the quiescent periods of the war no time was needlessly lost in treating patients for whom the slightest hope of cure existed, since the onset of intensive air-raids it has on occasion proved difficult to arrange the admission of patients to hospital as rapidly as one might have wished. Another point of importance is the difficulty in obtaining radon supplies at reasonably short notice. This difficulty led to an early request by the honorary staff for the resumption of the use of radium needles, but no further action was taken at this hospital until recently.

An efficient follow-up system is an essential part of any cancer service, its primary objects being to facilitate early detection of recurrence or of further metastases after treatment, and to permit correct assessment of late results of treatment and comparison of different methods of treatment. It is thus a necessary adjunct to clinical cancer research. The efficiency of this system at the hospital has for various reasons dropped from 95% to about 55%. Many patients have evacuated. Some have kept in touch with the hospital but many have neglected to do so. Others have lost their homes as a result of enemy action, and have been very difficult to trace. Private doctors are often of great assistance in providing information about patients who cannot attend regularly for examination. In several cases these doctors are either on military service or have lost their surgeries by bombing so that it is difficult to make contact with them for information. Other hospitals occasionally undertake the follow-up of patients living in their districts, and in some cases we have been deprived of follow-up information owing to the destruction of their hospital records. Although outpatient sessions are held in the morning to save patients travelling during the blackout, difficulties of transport or fear of air-raids have prevented some patients reporting. We do not as yet know whether any of the untraced patients have been killed by enemy action, but it may be necessary to make allowance for cases of this kind in future surveys. The effect on the patients of the lack of regular supervision is seen from time to time when an untraced patient ultimately appears with an advanced recurrence, having delayed coming for one of many possible reasons connected with the war.

Even in normal times, with a full range of foods to choose from, the feeding of patients undergoing teleradium treatment for cancer in the head and neck region is fraught with difficulties. Not only does the treatment induce anorexia and perversion of taste but reactions in the irradiated mucous membranes give rise to dryness, pain and dysphagia. Ordinarily, semi-solid or fluid diet containing eggs, milk, fats and carbohydrates of high caloric value form a basic food designed to supply 2000 Calories per day, which is considered the minimum requirement for these patients. But in spite of difficulties in obtaining many of the common items, the culinary ingenuity of the nurses responsible for feeding these patients has been such that no patient has suffered as a result of the shortage.

Two other points deserve mention. Most of those undergoing teleradium treatment are inpatients, and during periods of intense air-raids are often concerned about the welfare of their relatives. This worry, added

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to the mental depression usually associated with the long and tedious course of the treatment, affects adversely the well-being and equanimity of many patients. They become irritable and non-coöperative, often at a time when full coöperation is imperative, and when the actual treatment is completed they hasten home long before their reactions have subsided or they are fit to go. As home often means a public shelter at night, the chances of a debilitated patient succumbing to an intercurrent infection is high, and we have noted the death soon after leaving hospital of 2 patients who would probably have survived had they remained in hospital until they were fit to go. For treatment of cancer by irradiation to be effective regard must be paid to the time over which the treatment is spread. Any appreciable interruptions or delays in the ordered continuity of treatment diminish its value. Several times since September, 1940, patients have interrupted their treatment to return to their homes—or erst-while homes—because of a tragic domestic sequel to an air-raid. In a few cases when the patients have not returned to complete the treatment it is certain that they will succumb to their disease. Where the patients have returned it is as yet too early to assess the precise effect the delay may have on the ultimate response to treatment.

We would like to acknowledge our gratitude to the members of our staffs who have carried on their normal and abnormal duties under very trying circumstances, and have thereby enabled radium treatment to be continued in this hospital. In particular we would mention Miss E. W. Glazebrook, sister in the radium department and Dr. J. R. Clarkson of the physics department. The accessories to the borehole were constructed by Messrs. H. Hodt, senior and junior, technicians to the physics department.

INTERNATIONAL STANDARD FOR VITAMIN E

AN international standard for vitamin E has been established and, as in the case of the international standards for vitamins A, B_1, C and D, the National Institute for Medical Research, London, acting on behalf of the Health Organisation of the League of Nations, has undertaken its supply to laboratories, institutes and research workers throughout the world.

Synthetic racemic α-tocopheryl acetate ($C_{31}H_{52}O_3$) has been adopted as the international standard for vitamin E. The investigation of the chemical, physical and biological properties of this substance, its suitability for adoption as the international standard and the manner of its application in biological assay was carried out, at the request of the Health Organisation of the League of Nations, by the vitamin E subcommittee of the accessory food factors committee of the Lister Institute and the Medical Research Council. The subcommittee were able to enlist the coöperation of experts in fourteen laboratories in Europe and America, and have recommended the adoption of synthetic racemic α-tocopheryl acetate as the international standard. They further recommend that the international unit for vitamin E should be defined as the specific activity of 1 mg. of the standard preparation, this being the average amount which, when administered by mouth, prevents resorption-gestation in rats deprived of vitamin E.

In normal times the results of the coöperative investigation would have been submitted for discussion at the third international conference on vitamin standardisation, which had been arranged for the autumn of 1939, but because of the war this conference was not held. The report and recommendations of the subcommittee have, however, been placed before the members and officers of the League of Nations' Permanent Commission on Biological Standardisation and of the International Conference on Vitamin Standardisation, who were available, and they have accepted the responsibility of adopting the proposed standard for vitamin E, accepting the recommendation defining the international unit, and authorising the National Institute for Medical Research to proceed with the distribution of the standard.

The international standard for vitamin E is issued as a solution in olive oil of which one international unit is contained in 0·1 g. In countries where national control centres have been established it will be supplied to their directors for local distribution; it will also be supplied to laboratories, institutes and research workers in this country, and in countries in which national control centres have not yet been set up. Application should be made to the department of biological standards of the National Institute for Medical Research, Hampstead, London, N.W.3.

MEDICINE AND THE LAW

Illness after Hotel Lunch

CATERING establishments do not guarantee the health of every visitor to whom they serve a meal. Actions for damages are sometimes brought by visitors who have felt ill after eating at a restaurant or hotel. They do not always succeed; *post hoc* is not necessarily *propter hoc*. In the recent county court case of Braham *v.* Grand Hotel, Birmingham, a lady gave evidence that, while eating steak and kidney pie at the hotel, she found something unexpectedly solid in her mouth. She thought it might be a piece of tooth; it turned out to be a chip of crockery. That night, she said, she woke in great pain; there was medical evidence that she was suffering from food poisoning. She claimed damages for breach of warranty of the quality of food supplied; alternatively she alleged negligence in allowing the food to become contaminated. On the other hand, the defendants denied that the food was defective or that their staff had been negligent. There seemed no necessary connexion between the chip of crockery and food poisoning. They had served nearly a hundred portions of steak and kidney pie that day, and this was the only complaint. The city bacteriologist found no poisonous organisms in the pie. The judge disregarded the crock. He found no indication of slackness in the conduct of the hotel. The only suggestion against the pie was that the plaintiff was ill after eating it: it would be unsafe to say that the illness was due to the hotel luncheon. Judgment for the defendants with costs.

NEW OFFICIAL NAMES FOR DRUGS

THE General Medical Council has issued a further list of approved names for drugs which are now produced or likely to be produced in this country.

Approved name	*Other names*
Amethocaine hydrochloride	Decicain
Menaphthone	2-methyl-1 : 4-naphthoquinone
Pethidine hydrochloride	Dolantin
Soluble phenytoin	Epanutin, Eptoin, sodium diphenylhydantoinate, Solantoin, Soluble Dilantin.
Sulphacetamide	Albucid

The council hopes that these and the approved names previously published [1] will be generally adopted.

ORTHOPÆDIC CONFERENCE AT ROEHAMPTON

A CONFERENCE of the orthopædic surgeons attached to the Ministry of Pensions hospitals was held at Queen Mary's Hospital, Roehampton, on Sept. 24–26, Mr. G. R. Girdlestone, honorary consultant to the ministry, presiding. Clinical rounds were conducted by Mr. Pomfret Kilner and Mr. George Perkins, and Mr. Fraser demonstrated the methods used by himself and Mr. Kilner in fractures of the jaws. Dr. R. D. L. Kelham, surgeon in charge of the limb-fitting department, assisted by Captain Maxwell, gave lecture-demonstrations on modern artificial limbs, and explained the present-day sites of election—for an above-knee amputation 10 in. below the tip of the greater trochanter; for a below-knee amputation 5½ in. below the level of the knee-joint on the medial side; for an above-elbow amputation 8 in. from the acromion process; and for a below-elbow amputation 7 in. from the tip of the olecranon. Surgeon Lieut.-Commander John Bunyan, R.N.V.R., showed a cinematograph film of the results of treating burns by irrigation with electrolytic sodium hypochlorite in the Stannard bag, and afterwards demonstrated his procedure on patients from the Queen Alexandra Hospital, Cosham, and other cases with septic amputation stumps and wounds. The conference provided an opportunity for exchanging views on orthopædic treatment and coördinating the work being carried out in ministry hospitals.

1. See *Lancet*, 1940, 1, 804; 1941, 1, 614.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE call was for blood—human blood. It all began in the early summer of 1939 when a well-known radio commentator asked a responsive public to report for service at their nearest hospital. What was to be done with all these volunteers? Were they to be admitted to our select body of hospital donors or were they to constitute a "national emergency panel—Garumchester (pronounced Gumster) branch." We decided on the latter course. In the rapidly growing queue outside the pathological department the secretary discerned some of Garumchester's leading citizens, including civic and legal dignitaries, a retired aristocrat of the Church and another volunteer entitled to wear a small size in coronets. "Am I to enter them all for Wassermanns?" she asked, betraying her concern at the serodiagnostician's lack of discrimination. Our senior technician remarked that an occasional transfusion of luetic blood would make little difference after three or four years of total war, but his implication was considered to be both unjust and cynical. "Why not wait and do the Wassermann when you take the blood?" he said; "the fact that they are negative now doesn't mean that they will be after a couple of years of war. Anyway, what's arsenic for?" The essential wisdom of his remarks was accepted and the volunteers were rapidly reviewed, being let off with an inspection of the arm veins and the token donation of two or three drops of blood for the grouping test. We closed the laboratory that evening with schemes already afoot for running the department on a war basis. If the worst happened pathological investigations would have to be rationed, clerical work curtailed and all reports shortened. We sincerely hoped war would not come but we were resolved that if it did there should be no deterioration in our ability to aid in the diagnosis of venereal disease. "Do you mind if I slip off a little early tonight," asked the senior technician, "to plant a few more rows of winter greens for the guineapigs. We can't afford to let the complement fall below 0·08 in war-time," he added, "and an intensive course of purple sprouting before the breeding season is beneficial; if it comes to that, it wouldn't do me any harm myself."

This is a war of battles. The Battle of the Blood Groups is still on. We were all asked to adopt the League of Nations classification and most of us did, bearing the genial sarcasm of the more senior clinicians. "In my day, my boy, 1, 2, 3 and 4 were good enough for us; why alter it?" "But, my dear Hornbeam, the newly adopted classification does tell me the agglutinogen content of the corpuscles, and therefore I find it preferable to the Moss and Jansky schemes which lead only to confusion." "I should forget about those—those things you were talking about," rejoined our pathologophobe, emphasising his remarks with the instrument of precision which is habitually suspended around his neck, "we always managed to transfuse without them before you came here and if you take my advice you will not alter the present arrangements. Of course, transfusion came in after my day, but I have watched it develop." "Did you ever run across James Blundell, of George's, sir? He was one of the first on the job." "I used to go there quite a lot when I was dressing at Ananias's," he replied, "but I don't recall him." "He may have been after your day," I rejoined cautiously. "He wasn't born till 1790."

Many of us have met this unwillingness to accept the international classification; the compromise which most have adopted is to give that of Moss first followed by the international version in brackets. The more daring have reversed the procedure and told our printers to lighten the bracketed numbers with each succeeding impression. The dual system of nomenclature has raised misgivings in some donors, who don't much like belonging to group B3. "I live a healthy out-of-doors life and never had a doctor since my last baby, but Mrs. J. around the corner in Plaice St. has blood which the doctor said is very rich—he called it A1—and she isn't nearly so particular as to what she eats. Tell me, doctor, what I ought to take to make my blood A1?" What a blessing the Geneva tribunal didn't ordain A, B, C and D for the groups! C3 blood would have taken some explaining away.

* * *

In our area is included what must surely be the most delightful small country town in England, far from forgotten by the poets. In this charming community the keenness for the blood-transfusion service exceeded anything previously seen, and on a warm day in June we enrolled close on 8% of the population as donors. The local organisers were surprised at the success of their scheme and were anxious to reach a certain round number. A request was therefore sent to the cinema nearby, the pub opposite and the adjoining dance hall. The response was gratifying. The cinema interrupted its performance while the visitors, led by the jovial manager and the bar-tender, with his thirsty followers, filed in to be tested before resuming consumption of films and drinks. Later, on this summer evening, a procession of men and girls from the dance hall arrived, the girls still wearing their cool and colourful evening frocks. Afterwards we were able to report that the required number had been exceeded.

Most of our donors hide their lamps under bushels. A few of them, however, are fussed over by anxious relatives who are assured by the victim that although it wasn't too bad the fact remains that he is now working with a pint less blood than before; but that he doesn't intend to let the work suffer for it and he will see that it is done just the same. It requires more than average human effort of will to discourage the hero-worshipper. But this type of donor, who is fortunately rare, may do much to delay recruiting in a small community, and embarrass the machinations of the local hæmophilist. On the other hand, we have met with many instances which reflect great keenness to serve, as well as personal courage. There was the youth who had recently lost an arm in an accident and whose other arm was ankylosed to an angle which would have made it wellnigh impossible to insert the needle. The deaf, the lame, the blind and even the paralysed have visited us to give their donations. We have had to reject many who were too ill—a woman with carcinomatosis, a girl in an advanced state of phthisis and an old man with heart failure; he had been compelled to abandon munition work and had chosen this alternative form of national service. In one hamlet no less than fifty near neighbours assembled in a farmhouse kitchen on a Sunday evening in late spring and braved a deluge to get through. An old lady who was rejected because of ill health burst into tears.

One afternoon in winter we were due to group inhabitants of a few lonely hamlets pocketed away in the hills. Our hostess's suggestion to "bring chains" seemed to us in the town sixteen miles away rather fatuous, but we were glad of her advice and only after a hazardous and circuitous route did we reach the house. Our fears that the volunteers would not venture through the storm were dispelled by our hostess who assured us that they would all come—as indeed they did. They came through driving snow and the blackout, fine hefty farm lads, land girls and farmers' wives, all ready to give first-aid to the blitzed cities. We have had girls of fifteen and sixteen posing as eighteen in order to be accepted, and old men and women taking off ten years or so; and what a good response we have had from ex-Service men of all ranks. In fact, there is no section of the community which has not responded, while friendly, neutral and enemy aliens have come forward equally well. It is particularly gratifying to enrol people who have themselves been transfused at some time in the past and are now ready to pay back. Evacuees and especially those from the bombed areas are amongst our keenest customers. One woman had come over from a nearby town, temporarily disorganised after a heavy raid, in order to shop; she was so delighted at her successful forage that she came along to show her appreciation by an offer of blood. We had a visit from a member of the London A.F.S. who had been sent down for a week's rest. He was so grateful to the inhabitants for the hospitality they had shown him that he came along to give a donation of blood to the local bank by way of repayment. He wrote later "How are your blood donors, are they rolling in, or do you sit patiently gazing at your samples, waiting for a customer to call? Should the patient who had my blood ever complain of hearing fire-bells, just tell him it is a false

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alarm. Don't forget, doc, if you want more just let me know and I'll be right on the spot. Funny thing, hardly ever gave hospitals a thought until that day, then I realised that every day there are patients and children there. P.S. Your blackout is deplorable."

* * *

By tortuous ways a copy of the *Deutsche medizinische Wochenschrift* for Sept. 5 has come into my hands and I have eagerly scanned the page of *kleine Mitteilungen* (or news stories) which is all that this fat medical weekly allows itself to tell of current happenings in *Grossdeutschland*. Pride of place is given to an announcement of a final medical examination next June under the new regulations which prescribe two preclinical and two clinical years or four years of medical study after military and labour service are over. The old regulations remain in force at Vienna, Graz and Innsbruck. Women medical students will be allowed to count emergency nursing as part of the prescribed course in place of factory and agricultural service. Then we are told that the *Führer* has set up in Berlin under Home Office control an official institute for assessing vitamins and finding new ones. There was to be a three-day festival in Salzburg to Paracelsus with foreign guests and a gala performance of Goethe's "Faust," followed by a two-day conference on the Alpine climate, opened by Dr. Conti, medical director-general, and covering besides physiology, psychology and the inevitable raciology, such things as hypnotic drugs, sulphonamide therapy and the treatment of sterility. A ten-days course at Alt-Rehse has the astonishing title of "The totalitarian idea in dentistry," with lectures on chewing gymnastics, relaxation therapy and psychopathology of artificial dentures, as well as the more familiar focal infection. Scanty university news is eked out with some trifling honours to Prof. Paul Diepgen in Buenos Aires and Bucharest, and the 70th birthday of Prof. Birch-Hirschfeld. Book announcements include the final instalment (bibliography) of Bamann and Myrbäck's "Methods of Ferment Investigation," a new study of the anti-tuberculosis campaign, two small practical books on diabetes, a standard work on the public-health doctor, and a new edition of Schede's "Hygiene of the Foot." Not very exciting, you may say, but nevertheless a rough sketch of the background of medicine in contemporary Germany. But one of my fellow peripatetics might have made more of it.

* * *

I was rather surprised to hear the other Sunday that the Brains Trust had no idea why man enjoyed music. Obviously man's acoustic apparatus was not formed for hearing his own and other people's voices. It was formed for defence, though for this purpose, in modern times when auditory awareness is not of such vital necessity, it has atrophied. As natural man or any other animal moves about he is surrounded by a myriad noises, the manifold rustlings of the vegetable world, the rippling of the poplars, the harsh whisper of the holly, the dry-sand sound of the acacia, a vast insect orchestra, the song of sea or river, animal and bird calls, and the noise of his own movements. As a babe he was frightened of some of these noises, but gradually one by one he admitted them as friendly noises, until their number was so large that he couldn't give them individual attention; so, probably by allowing entrance to a note here and there from each, he blended them into a pattern. This pattern of friendly noises surrounded him in his waking hours and to some extent in his sleep. (Most sailors wake up if the ship's engine stops when they are asleep.) This pattern is a protection, like tentacles cast near and far, for the approach of an enemy or even the sudden cessation of one of its constituents would break the pattern and put him on the alert and in a mild state of fear. The hearing of the pattern then meant safety. Modern man uses the same mechanism though not so often for defence; he can turn what he knows to be a harmless and friendly railway train's noises into a rhythm—arankatitanka-titanka. He can turn his own wireless blare into a soothing background of sound, though he has much more difficulty with his neighbour's which he feels to be hostile. Absolute silence, which is a rarity in the natural world and meant to man that he was without his acoustic protection, still brings a feeling of awe. Incidentally in tinnitus there is a great effort on the part of the pattern-making mechanism to turn the intrinsic stimulations of the cochlear nerve into friendly noises—"wind in the chimney" and "an outboard motor with an occasional mis-beat" are the last two in my case-book. Now music, and to some extent verse, not only gives a well-ordered pattern of noise and therefore a feeling of safety, but it does so ready made, without any strain on the pattern-making mechanism, leaving the other emotions, uninhibited by fear, free to have a binge. Why precisely "Rule Britannia" should make one want to cut throats and Handel's Largo to ooze altruism probably depends on memories, words or suggestions, associated with their particular chords. Elementary, my dear Julian!

* * *

It is traditional that a doctor is unwise to treat the members of his family, from which arises some of the difficulty about repaying a colleague for kindness. I have never held this view; the unwisdom supposes that the medical husband and father is either unable or unwilling to approach the case detached, or that he finds it irksome to regard such a patient in terms of anatomy, physiology and pathology. Maternal anxiety may be the cause of much of this. The same doctor, however, essays the correct approach to those non-family patients with whom he is on terms of close social intimacy. How many doctors find it inconvenient to make an internal examination of a constant bridge partner? If for no other reason than this, the plight of such a patient justifies the existence of the independent consultant group. Years ago as I was leaving home one morning my neighbour, a London surgeon, told me almost casually that his wife's bowel was resisting enemata; the number had reached seventeen. I knew nothing of her medical past, which included operation for ovarian cyst, but I murmured equally casually that a band might be the cause. On my return in the evening the ambulance was at his door and a surgeon ready at the nursing home, but she died that night. Lately I have myself had the care of a doctor's wife at a distance. He has no colleague within ten miles and more; on the eighth day he asked me to come over. I found lobar pneumonia, with the crisis yet to come in spite of his sulphapyridine. He had not been able to diagnose pneumonia for certain because his wife was still about and had declined to permit him to investigate.

* * *

"You are going on holiday next week?" I inquired. "Aye, next week, Sir," replied John, the senior laboratory attendant, adjusting the time-marker. "Rothesay?" "Aye." "The children will be very excited?" I ventured. "Aye, they are so." "And what about yourself, John—do you still enjoy a seaside holiday?" "Aye," he said again; but this time his tone implied serious reservations. He was obviously uneasy. His answer would need elaboration. I watched the struggle between his innate reticence and his Covenanter's zeal for truth. At last he looked up. "Doctor," he began. "Yes?" "Shall I tell ye what I consider to be the best part of ma holiday?" he asked solemnly. "Do!" I exclaimed enthusiastically, and settled down to listen. Would the high spot be the morning stroll along the promenade? Sun-bathing? No, I felt sure that John would frown on that; but I was prepared to hear that in moments of complete abandon he might go so far as to paddle with the three weans. "Well, Sir," he proceeded, as a faintly ecstatic expression crept into his face, "the best moment is when the train draws into Central Station when we return to Glasgow. Man," he added almost fervently, "yon's a grand smell!"

* * *

The registrar, being in a reminiscent mood, launched into an account of the death certificates which he had returned to the hospital. First came the surprising death of John Smith, aged 3 days, from chronic bronchitis and senility; and, on the same day, of William Brown, aged 86, from intracranial hæmorrhage due to birth injury. Then came the form, satisfactory in all respects except for the completion of the section "qualification." Here the worried doctor, straight from a pneumonia ward, had started with M.B. and then drifted to 693. A useful qualification, perhaps, for this day and age.

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Parliament

Post-War Hospital Policy

IN the House of Commons on Oct. 9, in reply to Sir FRANCIS FREMANTLE, the MINISTER OF HEALTH said: The question of post-war hospital policy and reorganisation, more particularly in relation to the Emergency Hospital Scheme, has for some time been engaging the attention of the Government. While any immediate reorganisation must be regarded as impracticable in present circumstances, certain broad principles can be laid down as the basis of Government policy.

It is the objective of the Government as soon as may be after the war to ensure that by means of a comprehensive hospital service appropriate treatment shall be readily available to every person in need of it. It is accordingly proposed to lay on the major local authorities the duty of securing, in close coöperation with the voluntary agencies engaged in the same field, the provision of such a service by placing on a more regular footing the partnership between the local authorities and voluntary hospitals on which the present hospital services depend. The Government recognise that to achieve the best results and to avoid a wasteful multiplication of accommodation and equipment it will be necessary to design such a service by reference to areas substantially larger than those of individual local authorities. It will be the aim of the Government also to avoid overlapping and uneconomical expenditure by securing the provision of the more highly specialised services at teaching hospitals and other centres selected to serve these wider areas, and by arranging for a proper division of function between hospitals in these areas.

With regard to the financial aspects of the Government's proposals, it is their intention to maintain the principle that in general patients should be called on to make a reasonable payment towards the cost whether through contributory schemes or otherwise. In so far as any new burden may be thrown upon local authorities in providing or maintaining hospital accommodation, or in contributing towards the expenditure of voluntary hospitals, a financial contribution, the extent of which will be a matter for further consideration, will be made available from the Exchequer. Special arrangements for dealing with the teaching hospitals by way of increased educational grants are in contemplation.

In present circumstances the arrangements for hospital services must be determined by war-time requirements, but the Government are anxious to take every step to avoid any unnecessary delay. I have already had preliminary discussions with the bodies representing the municipal hospital authorities and the voluntary hospital movement and I am hopeful that these discussions will be continued. With their concurrence I am instituting a survey of hospitals in London and the surrounding area, to provide the information needed as a basis for future plans. As regards the remainder of the country, valuable preliminary work has already been done in some areas by bodies representing both the municipal and voluntary hospital authorities, in particular, by an organisation formed under the auspices of the Nuffield Provincial Hospitals Trust. In any surveys which it may be found necessary to institute in the provinces I shall have full regard to the information already available in this way, which I am glad to know will be at my disposal for the purpose.

Mr. BROWN added that the aims of future policy in Scotland were generally similar, but that certain important differences in the Emergency Hospital Service and in the methods of financing voluntary hospitals in Scotland were being given special consideration.

Man Power and the War Effort

Man power is the beginning and the end of our war effort and a debate in the Commons on Oct. 8 brought out clearly the difficulty of striking a fair balance between the needs of industry and of the services. As Mr. GRAHAM WHITE pointed out, not only must we equip our men but we must man our equipment. He appealed to the Government not to confuse time with eternity and he warned them that the fabric of distribution by the food trade was wearing thin. It was no less important to fill men's stomachs than to fill shells. He did not think the Industrial Research Board was being given a fair opportunity of working out the best hours of work for different jobs. Miss MEGAN LLOYD GEORGE deplored the fresh call-up of land-workers, for though there may be an alternative between guns and butter there is no alternative between guns and bread. She felt that the production of red tape was still one of our major industries and asked for firm treatment of the small and select company of shirkers and for the admission of women as partners, and not as conscripts, in the greatest struggle our country has ever faced.

Replying Mr. ERNEST BEVIN said that no country, not even Germany, has tried what was virtually the compulsion of women as we have tried. But in handling women you must proceed gently and have regard for the parents. He was coming to the conclusion that block reservation would have to go and that individual reservation would have to take its place. He wished that the process of training and manning the country had taken place in peace-time and not in war-time. He would have liked to see a double-purpose army where the whole nation was trained both for fighting and production. But such a policy could not be achieved if the War Office was completely scrapped in peace-time and the Government was expected to improvise a military machine and carry out gigantic tasks in fifteen months.

QUESTION TIME

Priority Milk

Replying to a question Major G. LLOYD GEORGE said that on the recommendation of the Special Diets Committee, the milk supply scheme (see p. 473) makes provision for a wider range of sick persons than the scheme for regulating distribution which has operated throughout the summer. The arrangements for expectant mothers, children and adolescents are also based on the advice of nutritional experts.

Domestic Staff Difficulties

Miss E. RATHBONE asked the Minister of Health whether he was aware that many voluntary hospitals were seriously hampered, and some may even have to close down wholly or partly, owing to lack of ancillary staff such as stokers, porters and ward-maids; and as the work of these hospitals was work of national importance he would assist them by announcing this and by devising, in coöperation with the Ministry of Labour, some method of aiding the hospitals to obtain the necessary staff.—Mr. E. BROWN replied: I have for some time been concerned with these difficulties and I have recently discussed them with representatives of voluntary hospitals. Domestic work in hospitals is recognised as one of the services of most urgent national importance for which recruitment is to be carried out by the Minister of Labour, and I have issued a poster for circulation to hospitals to make this importance clear to those already employed in hospitals.

In answer to a further question from Sir F. FREMANTLE, Mr. BROWN added that women, including domestic staff, employed in child welfare institutions are performing a very important national service and one which should offer special attraction to older women. I am assured, he said, by the Minister of Labour that there is no present intention of calling them up for selection interview within the age-groups covered by the Registration for Employment Order.

Return of Tuberculous Soldiers

Mr. T. E. GROVES asked the Secretary of State for War if he was aware that orders had been issued by his department for 40 tuberculous military cases in the Addington Hospital, Natal, and 120 similar cases at Oribi, to be returned to this country; and whether he would state the arrangements made for the reception, distribution and maintenance of these cases when they arrived in this country.—Captain H. D. R. MARGESSON replied: No special instructions have been issued by the War Office regarding these cases, and I presume that Mr. Groves refers to general instructions regarding the return to this country from South Africa of soldiers suffering from tuberculosis. On arrival in this country soldiers suffering from tuberculosis are sent to a military hospital where they receive treatment as necessary until they are handed over to the care of the local health authority.

Coroners in England and Wales

Replying to Dr. RUSSELL THOMAS, Mr. HERBERT MORRISON said: There are 297 coroners in England and Wales of whom, according to my present information, 13 are employed on a full-time basis. Several coroners occupy more than one

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coronership, the total number of coronerships being 333. The aggregate salaries of all coroners for 1939 amount to £99,307, and the expenses incurred by them in the execution of their duty to £145,666.

Pensions for the Blind

Sir ROBERT YOUNG asked the Minister of Health whether he was satisfied that the purpose for which the pensionable age of a blind person was reduced from 50 to 40 had been realised or whether his attention had been called to the extent by which local authorities had caused the financial benefits of the amended act to be reduced or cancelled; and what steps he proposed to take to give to eligible blind persons the benefit intended for them.—Mr. BROWN replied: It was always contemplated that a local authority in granting financial assistance to a blind person under the Blind Persons Acts would take into account the amount of any old-age pension received by him; and one of the objects of reducing the pensionable age for blind persons was to secure that the burden of providing assistance to blind persons should be shared between the Exchequer and the local authorities.

Exemption from Billeting

Mr. E. H. KEELING asked the Minister whether he was aware that a large proportion of the householders in Harrogate upon whom evacuees had been billeted had submitted medical certificates recommending that they be taken off the billeting list; and whether such certificates were being accepted.—Mr. BROWN replied: I am aware that a number of householders in this district have submitted medical certificates to support a claim to be relieved of the responsibility for accommodating billeted persons. In such cases the householder is informed that he has the right of appeal to the local tribunal set up under the Defence (Billeting Tribunal) Rules, 1939; and it is for the tribunal to decide whether exemption from the acceptance of billeted persons should be granted.

Public Health

From the School Reports

NOTTINGHAM

THE medical inspection subcommittee of Nottingham's education committee in 1940 consisted of eight members, two of whom, the chairman and one woman councillor, are doctors. The staff consists of Dr. Arthur Newth, senior medical officer for education, Dr. R. G. Sprenger, senior assistant, 4 other full-time assistants, 7 part-time specialists, 7 dentists; then there are a part-time psychiatrist, 2 educational psychologists, a speech-therapist and a social worker attached to the child-guidance centre; and finally 8 nurses and a full complement of clinical assistants, dental attendants and clerks. These attend to the medical needs of the 36,000 school-children of the city. In connexion with the evacuation scheme a survey of the children made it possible to test the completeness or otherwise of the record of defective children. Beyond some bed-wetters and children with behaviour troubles, few defectives were found who were not already known. "A large number of cases were reported as having some serious condition such as heart or kidney disease or tuberculosis which was found not to be present when the child was last examined. This supports the idea that the avoidance of invalidism is a not unimportant function of the school medical service." It is of course possible that some of these chronic "invalids" had developed serious disease since their last examination, but presumably the passage means that they had not done so. Generally a survey of children absent from school for long periods reveals that the great majority are not suffering from any disease to warrant their non-attendance, a few are found with lesions which make them suitable for special education which it is the duty of all education authorities to supply, and the remainder, an extremely small number, are either dying or incapable of survival beyond the school-leaving age. The number of children whose lives are wrecked because somebody has detected an innocent heart murmur or albuminuria greatly exceeds that of those destroyed by disease. This is one of the major truths of the school medical service.

Dr. Newth, in discussing the increase of scabies, which Nottingham shared with most parts of the country, recalls that in the last war there was a similar increase often associated with the return of a soldier on leave; but the present epidemic started before the war, even before conscription, and the incidence of scabies in those serving in the Forces in this war has not been severe. He says that scabies occurs chiefly among unclean people, but the connexion is not direct; scabies infection is, in fact, very common in clean people, but in them the mite is soon dislodged, so we very rarely see anything more than a deserted burrow except in the dirty. In contrast to scabies, body lice are rarely found in school-children, even those of the dirtiest and most neglected families. "Towards the end of 1940 one began to notice a deterioration of the clothing of some of the children," but their nutrition was maintained at an excellent level. Dr. Newth says he cannot understand the mentality on the part of a mother "who, having made the brave decision to send her child overseas, withdrew her application when she was told that dental treatment was essential."

SMETHWICK

Dr. Hugh Paul says that the outstanding feature of the year was the continuing high standard of physical and mental health which was maintained throughout. "Even the sustained night bombing of the last quarter failed to have any visible adverse effect on the children." It seems likely that the unprecedented high level of health and nutrition which we reached before the outbreak of war largely accounts for the comparatively slight effect air-raids have had on the health and morale of our people. If so, it means that in the end the butter will beat the guns.

Among 8254 school-children of Smethwick, 74 were in 1940 referred to the chest clinic for suspected or possible tuberculosis. Of these, one was found to have definite pulmonary tuberculosis and one another form of the disease, 61 were excluded as not tuberculosis, and 11 were suspected of possible pulmonary tuberculosis. Suspected pulmonary tuberculosis in children and adolescents is one of the most difficult medical problems of the present day. To make a positive or negative diagnosis where this cannot be better than a guess may easily be disastrous, for if it is wrong it must lead either to unjustified invalidism or to the loss of opportunity to avert a fatal disease. How to keep a suspect under supervision without creating invalidism is a problem medicine has not yet solved, yet in theory it is easy and the most useful work that a physician can do.

KENT

In the second half of 1940 Kent became a battlefield, so what had been a reception area had many shifts in school population. The part of Kent which for education is administered by the county remained in the main a reception area, but the coastal towns which are their own education authorities had many vicissitudes, with the result on the county that though the school population remained fairly constant in numbers, it was much disturbed. Moreover, the county was subject to repeated air-raid warnings, so the children passed much of their time in shelter conditions. Yet, from Dr. J. W. Fox's report, presented by Dr. Constant Ponder, the children's health and spirits did not suffer appreciably, and from the school medical statistics of the year it would not be possible to tell that anything unusual had happened. Dr. Fox gives a brief but most interesting note on the improvement in nutrition of evacuees as measured in terms of growth. This is striking and widespread, and is not wholly explained by the change from town to country life. "The evacuees compare favourably with native children. Perhaps the same can be said where Kent children have gone." Change, in itself, seems to be favourable and Dr. Fox suggests as a permanent feature of education periodic exchanges of children from one district to another.

The Kent dental scheme does not yet make general provision for the treatment of pupils in secondary schools but this is available to some extent. The senior school dentist in his report remarks that in some schools the parents though unable to afford private dental treatment do not take advantage of the clinics with results that are deplorable. "Many of the pupils at these schools present an appalling amount of gross oral sepsis." He attributes this refusal to accept treatment to "a curious form of snobbery, either on the part of the parents or, more frequently, of the children themselves."

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From the Annual Reports

CORK STREET FEVER HOSPITAL, DUBLIN

Dr. C. J. McSweeney's report for 1940 is written on a general note of optimism. Amongst 2160 patients treated (a record figure) there was a gross mortality of 5·5%, the lowest ever recorded in the history of the hospital. Gravis diphtheria is apparently still prevalent in Dublin but the fatality (6·5%) shows a slight improvement from the previous year, although clinically the cases appeared to be more severe. This success is attributed partly to the use of "avid" diphtheria antitoxin in certain severe cases, an experiment which has been recorded already in these columns (McSweeney, C. J. *Lancet*, 1941, 1, 208). Whether one agrees or not with this conclusion, further elucidation and trial of the elusive "anti-B" factor in diphtheria antitoxin remains a matter of impelling interest. Nine cases of diphtheritic respiratory paralysis treated in a Bragg-Paul pulsator did well, but Dr. McSweeney seems hardly justified in asserting that the 48 patients whose recovery has been credited to this machine since 1935 would inevitably have died without mechanical aid to respiration. Streptococcal diseases fared well during the year, there being a trifling mortality (0·87%) in scarlet fever, one death in 20 cases of puerperal sepsis and no death at all amongst 78 cases of erysipelas. Dr. McSweeney does well to remind us how much the modern treatment of erysipelas owes to chemotherapy. Chemotherapy in combination with specific serum was used in the treatment of 30 cases of meningococcal meningitis and 28 recovered, a result for a small series which could scarcely show improvement. Nor could a fatality of 1·83% for 109 cases of lobar pneumonia treated with sulphapyridine and specific serum. Bronchopneumonia alone or in combination with measles or whooping-cough fared less well. Indeed a curiously high fatality of 21·8% in whooping-cough appears almost wholly to have been due to bronchopneumonia, no less than 64 out of the 94 cases treated being so affected.

DUBLIN'S HEALTH.—In an address to a conference of municipal authorities Dr. M. J. Russell, superintendent M.O.H., for Dublin, said that the extension of the city boundaries during the last twenty-five years has increased its area from 7911 acres to 18,777 and its population from 312,750 to 491,800. The density of population has thus been reduced from 38·8 persons per acre to 26 per acre. The death-rate per 1000 in 1915 was 21·8; last year it was 14·5. The death-rate from tuberculosis had fallen by more than half. Credit for the progress in the prevention of tuberculosis, and improvement in general health, was in part due to better housing and wages, and a purer milk-supply. Dr. Russell advocated a system of differential rentals which would discriminate in favour of the tuberculous.

Infectious Disease in England and Wales

WEEK ENDED OCT. 4

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1217; whooping-cough, 2078; diphtheria, 997; paratyphoid, 87; typhoid, 34; measles (excluding rubella), 715; pneumonia (primary or influenzal), 629; puerperal pyrexia, 151; cerebrospinal fever, 109; poliomyelitis, 31; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 108; ophthalmia neonatorum, 80; relapsing fever, 1. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there were no deaths from measles, 4 (1) from enteric fever, 1 (0) from scarlet fever, 11 (0) from whooping-cough, 26 (3) from diphtheria, 33 (0) from diarrhœa and enteritis under 2 years, and 14 (0) from influenza. The figures in parentheses are those for London itself.

Birmingham, Wolverhampton and Poole each reported a fatal case of enteric fever. There were 3 deaths from diphtheria at Gateshead. In the same week Dublin had 45 deaths from diarrhœa.

The number of stillbirths notified during the week was 204 (corresponding to a rate of 40 per thousand total births), including 16 in London.

Dr. J. W. Trevan, director of the Wellcome Physiological Research Laboratories, has been elected a director of the Wellcome Foundation, Ltd.

Letters to the Editor

THE CHRISTMAS GIFT

SIR,—Old customs and traditions are greatly valued and treasured by elderly people. Memories of past days are very precious—perhaps none more so than those of happy Christmas days gone by. For many years your readers have most generously supported my appeal on behalf of the christmas gifts fund of the Royal Medical Benevolent Fund and the annual distribution of a gift of 30*s*. has brought great happiness to our beneficiaries, many of whom are old and lonely. I have now been president of the fund for nearly 25 years and would like to thank all who have responded to my appeal in past years and have every confidence that this year the same kindness will be shown. With an additional contribution we could raise our gift this year to £2 instead of 30*s*., which would give much pleasure.

Will contributors please address to "Christmas Gifts," Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, London, S.W.15, and their gifts will all be gratefully acknowledged.

THOS. BARLOW,
President, R.M.B.F.

ENURESIS

SIR,—Mr. Winsbury-White (*Lancet*, Sept. 20, p. 331) has analysed 310 cases of enuresis in an age-group, I gather, of 2–14 years. He finds that in 98% there was a history of at least one of the exanthemata. The significance of this figure is not explained, and I was further mystified when I found that the exanthemata "did not always precede the enuresis." One is reminded of the American surgeon who reported that over 90% of the married women on whom he operated for acute appendicitis had husbands who were cigarette smokers.

Mr. Winsbury-White has also made numerous observations on the normal calibre of the urethra at various ages, by noting the size of the largest instrument which will lie in the urethra without being gripped. Is the passage of sounds into the urethras of normal children of both sexes a psychologically justifiable procedure? He found, in 70% of these patients on whom he performed cystoscopy, inflammation of the trigone and the internal urinary meatus; and in 76% of those in whom the posterior urethra was examined, inflammation of this too. "Several cases with chronic coliform infection had so much dilatation in the upper urinary tract that the infection was obviously a complication of urinary stasis," but of the cases examined by urography "60% showed abnormalities in the upper urinary tract which, though slight, indicated early changes due to the chronic inflammatory process below." It would be interesting to know how he differentiates these apparently opposite groups. He adds, "Where the dilatation was without remedy so was the infection." In the light of the recent work of Helmholz and others at the Mayo Clinic, one would like to know what methods of treatment were tried before the infection was finally regarded as without remedy.

Lastly, he states that "the paraurethral glands of Skene and any glands (except those of Bartholin) which open directly into the urethra are the homologues of the glands of the prostate." The glands of Bartholin do not open into the urethra, but lateral to the hymen between its attached border and the labia minora. The homology of the prostate is a more complex business than the statement suggests, but in any case the next phrase ("and an infection of the vulval glands automatically involves the urethral glands") appears to be a non sequitur.

His observations, and the treatment that follows rationally from them, are of such importance that they deserve discussion. I want especially the pædiatrists to tell me whether the 97% who received benefit from urethral dilatation might not have been cured by the threat that "next time you do it, you'll have those things shoved up you again." Perhaps the 3% who obtained no benefit rather enjoyed the process.

Whitchurch, Aylesbury. RAYMOND GREENE.

SIR,—In 1918 I published a study on enuresis based on several thousand cases of all ages and I may therefore claim to be familiar with this disease. Mr. Winsbury-White

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seems to be under the impression, that an inflammation of the lower urinary tract is in most cases causally connected with enuresis. He does not mention the many other causes which produce this symptom—for example, the disturbance of the nervous control of the detrusor and sphincter muscles of the bladder, spina bifida occulta, epilepsy, idiocy, threadworm infection, onanism, and in a certain number of cases simple laziness and indifference. There are also large numbers of patients of all ages in whom none of these causes can be found, and who form the group of "enuresis sui generis." These patients have insufficient tone in the sphincter muscle and defective nervous conduction between bladder, spinal cord and brain. The contractions of the detrusor muscle under the influence of the full bladder are not considerable enough to wake the patient. Those cases in which every other form of treatment—whether by suggestion, drugs or instruments—had failed I treat with 3–4 epidural (sacral) injections of 30 c.cm. of saline, achieving immediate success in 85% and ultimate success in 68%. The injection causes a mechanical irritation of the lowest part of the spinal cord with its nerves to the bladder and the sexual organs. In men, priapism lasting several hours is often caused, and if cystoscopy is performed shortly after the injection hyperæmia of the lower half of the bladder which did not exist before is found in most cases. The patients feel the need to micturate more imperatively, and this wakes them up before they have passed urine. Lasting success I believe to depend on a kind of education of the bladder, comparable to the training of bowel action. Diet is also important as my cases fell to a quarter of the number when the fat deficiency of the last war was relieved in 1919 by the arrival in Germany of bacon from America. I agree with Mr. Winsbury-White that hyperæmia and chronic inflammation of the trigone and the neck of the bladder are common in adult women, and I published two papers on this as a cause of frequent micturition in 1905 and 1906, but I have generally found no evidence of such inflammation in children, with or without enuresis. Might not the hyperæmia be caused by the instruments inserted? The absence of every microscopic sign of infection in the urine of 85% of his cases seems to suggest this explanation, since in real inflammation of the neck or the trigone of the bladder a few leucocytes are always to be found.

ARNOLD HEYMANN,
Bensham General Hospital, Gateshead. Late Consultant Urologist at Luisenspital, Düsseldorf.

BIPP AND ITS FRIENDS

SIR,—I was very pleased to see your leader on the use of bipp, for to many of us who have used it in thousands of cases in this war and the last it still remains the treatment of choice. One great advantage, which you do not mention, is the ease and painlessness of the dressings; a man who is desperately ill and septic cannot stand the pain of removing a dressing that is sticking badly, or, on the other hand, a daily anæsthetic. This makes the treatment highly popular with the patient himself; he can eat his dinner after his dressing and there is not that rise of temperature due to opening up fresh paths of infection which must occur when the removal of the dressing causes bleeding from the granulating area. Any pus can escape quite easily between the wound and the gauze well "buttered" with bipp. If after excision of the wound, designed to leave as far as practicable a funnel-shaped cavity, a bipp-covered plug of gauze is carried lightly to the bottom of the wound, no dressing need be done as a rule for 2 or 3 days. The plug is then removed and never replaced; the oily layer left in the track will keep it well open and allow free drainage. It will rarely be found necessary to reopen the wound and in many cases it is possible to do a secondary suture in 7–10 days.

The bogy of bismuth poisoning is easily laid. I first heard of bipp when on leave from France in the last war, before, I think, any account of it had been published. Either my informant got the formula wrong or my memory luckily let me down and our bipp was made from bismuth carbonate 2 parts and iodoform 1 part. There is no reason whatever to use the nitrate, which is well known to have dangerous properties; the carbonate is absolutely safe and as much as 6 oz. used to be given for bismuth meals before barium came into its own. I have seen trouble from Morison's formula but never from the carbonate, while the lessened amount of iodoform also precludes any risk of iodoform poisoning, which did occasionally occur. During this war we have added 10% of sulphonamide powder and so greatly increased its value. Bipp used with bismuth carbonate is safe, effective and will please both surgeon and patient. I hope it will at least be given a trial by any surgeon who has not used it.

Southampton. H. JOHN NIGHTINGALE.

HOME GUARD PROBLEMS

SIR,—The views lately expressed on medical arrangements in case of invasion diverge on minor details of organisation and equipment needed but all are fairly unanimous about the existing position. Most correspondents agree that the arrangements made are totally inadequate; that the equipment issued is rudimentary; and that the little preparation that has been made is unsuitable to meet the conditions that can reasonably be expected during an attempted invasion.

It is six years since the shadow of war was first discernible in England (the A.R.P. Department of the Home Office was established in 1935). It is three years since every intelligent Englishman was convinced that war would have to be waged to stop German aggression and that all civil defence measures must be pushed to the utmost. It is over two years since the outbreak of war and it is more than a year since we were told that invasion should be expected at any time. After all this, suddenly to discover that our casualty arrangements made for invasion are practically non-existent can only lead to one of two conclusions. Either the criticisms levelled have no basis of reality and are therefore extremely harmful to morale, or responsible officials have been guilty of an oversight or lack of efficiency. The articles and letters calling attention to the lack of preparations are written by doctors engaged in Home Guard, civil defence and so on, who are therefore specialists in their fields with the facts at their disposal. One may quarrel with their conclusions but the picture they paint looks accurate. Are the arrangements which they think necessary in fact essential, and if so was it humanly possible to make the necessary provision before this?

Casualty services, besides their humanitarian aspect, have a direct military value, for they are essential to the sustenance of morale. It is questionable whether successful defence can for long be carried on if the medical service has broken down. At times soldiers may have to be asked to fight to the bitter end, even without a casualty service; and they will do this if they understand the reason why and do not feel that the lack arises from inefficiency on the part of those responsible for their welfare. In England where successful defence is so inextricably mixed up with proper morale the need for proper medical arrangements is vital for security reasons.

Was it, however, possible to make those arrangements? It can be argued that we had to expend our maximum effort on munitions production, fortifications and military training. This may be so, but even the manufacture of a million tanks and 24 hours a day training need not have prevented doctors and administrative officers pushing on their preparations to the utmost, for these are independent of the others. It may be said that medical services do not depend only on medical men and organisation, but that precious equipment is also needed and this could not be manufactured because of other calls on the factories. But A.R.P. and E.M.S. preparations were based on estimates and sustained casualty figures which were incomparably greater than any met so far or likely to be met for a long time to come. Equipment, then, has been prepared for all the casualties we may get, the only objection being that all our organisations and equipment are concentrated in the industrial areas, whereas Home Guard casualties will mainly occur in rural areas. It seems to have been forgotten that the Home Guard are our own civilians who have taken up the rifle in defence of their homes. As soon as it became apparent that the threat of invasion was changing the tactical picture of defence plans should have been reviewed and necessary steps taken to regroup our dispositions and redistribute

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our equipment. Both personnel and equipment are there, but bureaucracy and lack of foresight have prevented their being put where the danger is most likely to occur and made flexible enough to meet the new offensive strategy. The successes of the Nazis have come from their speed and unexpectedness. Our defence must be planned with this fact in mind.

Whose responsibility was it to make those arrangements? The Ministries of Home Security and of Health could perhaps have claimed that the Home Guard being military falls properly within the province of the R.A.M.C. This would be a short-sighted view, for the R.A.M.C. is but a limb of the Army, and the Army will always remain mobile; it may at any time again become an expeditionary force. The Home Guard was built to meet a need the Army could not meet, except at the risk of undue dispersal. It always remains static within its township and its casualties will be inextricably mixed with those of the civilian population. It must therefore remain a medical responsibility of the E.M.S. at any rate until the War Office decides to take over the whole civil defence of the country.

The Prime Minister said in his recent speech at County Hall that he is advised that our civilian preparations are being pushed to the utmost; that as a result of experience changes have been made and everything possible is being done. Can we have overlooked the medical arrangements in case of invasion?

Battersea. G. B. SHIRLAW.

SIR,—In your issue of Oct. 11 (p. 442) Brigadier Cowell turns his guns, wanton and unprovoked, on the Home Guard Medical Service, which has distressed him by using the expression C.C.P. (casualty collecting posts) to describe the posts which it arranges for the reception of its own casualties. Being to some extent responsible for that term I join issue with him at once. Practical experience of conferences with the civil authorities shows that they do not understand the nature of military posts unless those posts which are really distinguished in equipment, control and function are also distinguished by different names. The civil authorities meet with exactly the same difficulty when dealing with the military, most of whom are unaware of the essential differences between a first-aid point and a first-aid post. In vain does Brigadier Cowell proclaim that the initials C.C.P. are "confusing, redundant and unnecessary." So long as he requires three separate sets of initials to describe his own regimental posts—F.A.P., C.A.P. and even P.A.P. (platoon aid post)—he is in no position to rage about the mote in his brother's eye.

GORDON WARD,
Sevenoaks. Lieut.-Colonel, H.G.

PLUMP TYPE OF GRAVES'S DISEASE

SIR,—The paper under this title by Dr. Trotter and Mr. Eden in your issue of Sept. 20 I feel calls for some comment, since it results in making certain generalisations which are scarcely justified by the evidence. Familiarity with toxic goitre in all its many manifestations teaches that there is no classical sign of the clinical complex described by Graves which may not be absent, and it is dangerous to make any attempt to separate off any particular category as being fundamentally different from the rest. The medical officers who have worked in recent years at the L.C.C. thyroid clinic at New End have been familiar with the toxic patient who has not lost weight or may even have gained. Among several hundred patients treated by partial thyroidectomy there have been many more "plump" individuals than are recorded by Dr. Trotter and Mr. Eden, yet I do not recall that any deaths have taken place among them. As pointed out by Dr. Page in your issue of Sept. 27, death in these particular instances may have been due to some cause quite unconnected with the type of patient, and it seems to me to be entirely misleading to make a general statement that the type entails special dangers on evidence derived from so small a number. Lymphoid hyperplasia is common in all types of toxic goitre.

In addition to this it is, in my opinion, misleading to suggest that the results of thyroidectomy are likely to be uniformly worse in the "plump type" than among other patients. It is well known that the results are, in general, much less dramatic among the "atypical" categories (including the plump patients) than among the classical examples of "Graves's disease," and there is room for judgment in forming an opinion for or against operation. Nevertheless the more slowly obtained benefits are usually well worth having in the long run, and the delay is no argument for withholding treatment.

If I were to apply the principles of generalisation used by the writers of the article I might maliciously point out that among their seventy patients the mortality has been more than four times as high as it ought to have been. Let the causes for this be fully investigated, but I should anticipate that this mortality will not be repeated when the numbers treated in their clinic have materially grown.

Wendover. GEOFFREY KEYNES.

NATIONAL HEALTH ASSOCIATION

SIR,—I should like to bring to the notice of your readers the objects of the National Health Association, formed on Aug. 22 at Tunbridge Wells. It must be evident to the profession that big changes in medical and hospital practice will come about after the war, more especially since the Minister of Health has said that voluntary hospitals will receive aid from local authorities. At the second reading of the National Health Insurance, Contributary Pensions and Workmen's Compensation Bill in July many Members of Parliament expressed their strong disapproval of the medical benefits allowed to insured persons, and also of the lack of diagnostic and treatment facilities in insurance practice. The National Health Association was formed so that the public and medical profession could get together and solve, without interference from outside sources, such as vested interests and political parties, the problems that affect their common interest.

When the National Health Insurance Act was passed in 1911 doctors and the public became conscious of medical politics, or of the interest that the state was now going to take in the administration of medical benefits and the profession. This state interference forced medical men to find a refuge from the Government and the politician in the B.M.A. and the Medical Practitioners Union, but even after 30 years little or nothing has been accomplished for either the profession or the public. For obvious reasons the profession was not represented in the House of Commons as a political entity, and, except for a small number of doctors representing their respective parties, legislation from a purely medical viewpoint and also that of the sick man was impossible to implement. A square deal for the doctor and the patient was almost impossible, leaving the question of the remuneration of the profession in its present state and no special facilities available to the public, other than through the already overworked voluntary hospitals. Thus the whole subject of specialist medical benefits and remuneration in N.H.I. practice was left to the B.M.A. and the M.P.U. to adjust, which they have not yet been able to do. This I feel has been due to the fact that they deal directly with the Ministry of Health, an administrative body, and not with a legislative chamber. Parliament alone can solve this problem and the objects of the National Health Association are to educate the public and Members of Parliament in what the doctors and people desire and thus get legislation passed that is acceptable to all concerned. The association will make it possible for doctor and patient to sit round a table and discuss problems affecting on the one hand the economic position of the profession and on the other modern diagnostic and treatment facilities, clinics and hospitals which come within the scope of post-war reconstruction. It is hoped that, by means of properly directed propaganda, controlled by the profession and the public, the association will be able to influence public and parliamentary opinion, thus obtaining through Parliament a modern and efficient national medical service that is acceptable to all. The association is meeting with support throughout the country and although only a newborn child is rapidly expanding. I should be pleased to send a copy of its memorandum to any interested reader.

E. F. ST. JOHN LYBURN.
Hastings Clinic, Ferndale, Tunbridge Wells.

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LIGHTING OF WARDS

SIR,—After the war many hospitals will be remodelling their wards and the experience at the Moreton District Hospital may help in designing lighting systems. This hospital built two new wards in 1935 and for general lighting individual bed lights with additional central lighting was adopted; this is very satisfactory but care should be taken to fit the individual bed lights sufficiently high on the wall so that they cannot be smashed by a crane attached to the bed. For lighting during the night the matron, Miss M. B. Ockenden, suggested that the wards should be lit by concealed lights such as are used on the stairs and corridors of cinemas, and this idea was adopted. A fitting, the "Major Flush Louvre Light" (manufactured by Manjor Equipment Co.), was let into the wall where it would be underneath a bed, 1 ft. 8 in. above the floor. At this height the louvred openings are just below the level of the bed and the light cannot be directly seen by any patient in the ward; at the same time they illuminate the polished floor completely and the reflected light makes objects on the beds and lockers quite visible. This fitting could be improved, for the replacement of burnt-out bulbs is troublesome and the lowest power of bulb available is 15 watts, which is too high. Five of these were fitted in a ward of 12 beds 55 ft. 6 in. × 20 ft. and gave more light than is required; one light to 300 sq. ft. should be sufficient. This system of lighting has since been copied in the Acland Nursing Home and the Nuffield wards of the Radcliffe Infirmary at Oxford.

Moreton-in-Marsh. CLARK NICHOLSON.

OIL FOR FLOORS

SIR,—We were interested to read Dr. J. M. Twort's letter of Aug. 16 (p. 205) in which he pointed out the carcinogenic properties of spindle oil, and the danger which may therefore be associated with its use as a dust-layer on hospital floors. The term "spindle oil" is used to cover a wide variety of mineral oils of varying degrees of refinement, ranging from the relatively crude, carcinogenic lubricants employed in cotton mills to the highly refined, biologically inert white oils and the new paraffinum liquidum leve B.P. Cost is a useful indication of the degree of refinement of these oils, the more highly purified oils costing 2*s*. 6*d*. per gallon while the cruder ones may be obtained for less than half this amount. The extent of the danger of using "spindle oil" as a dust-layer depends on the degree of refinement of the oil used and the frequency with which it is applied to floors, so that care is necessary in selecting an appropriate oil. We have always used a well-refined oil of the more expensive type, the specifications of which we have defined (*Lancet*, 1941, 2, 123). Dr. Twort informs us that this oil is unlikely to be harmful, and we consider, therefore, that the danger associated with the application and presence of spindle oils of this nature on hospital floors is negligible. Should circumstances necessitate a prolonged and intimate contact of the skin with the oil before and after it is applied to the floors the still more highly refined oils may equally well be used. These oils are equally efficient dust-layers, but are slightly more expensive that the spindle oil we have used. Dr. Twort has kindly tested such an oil for us (Technical White Oil refined by the Manchester Oil Refinery, Ltd.) and found it to be biologically inert. It was the consideration of the carcinogenic properties of the cruder oils which led us to recommend the more highly purified oils for dust-laying on bedclothes, where intimate contact between the patient's skin and the oil is inevitable.

M. VAN DEN ENDE.
JOHN C. THOMAS.

National Institute for Medical Research.

THE GOVERNMENT AND PROPRIETARY MEDICINES

SIR,—At the recent annual general meeting of Beechams Pills Ltd., the Chairman said (as reported in the *Times*):

"For the ninth successive year our trading profits show an increase. The profit for the year amounts to £1,085,893. . . .

"The company's normal trade both at home and overseas, without accounting for Government contracts, shows considerable expansion. . . .

"Since we last met, Parliament has passed the Pharmacy and Medicines Act of 1941. . . . Generally, it is hoped that the new Act will improve the status of proprietary articles and patent medicines. The directors have decided that the full benefit shall be given to the public. . . ."

As regards the Government contracts mentioned, the Financial Secretary to the Treasury, in reply to Sir E. Graham Little, M.P., said on Sept. 30: "So far as I have been able to ascertain, no Government department has a contract with this firm." I think the profession is entitled to know which of these two statements is correct.

Leicester. N. I. SPRIGGS.

RADIOLOGY AS A CAREER

SIR,—It is with surprise that I read of the novel scheme for producing radiologists, revealed in your annotation of Oct. 11 (p. 432). It is difficult to appreciate the reason for the unusual step that is being taken, unless a shortage of radiologists is upon us. At present there is no evidence that such is the case. I have recently been informed that no radiologists are required by the E.M.S., and as the Services will not take them without considerable clinical and radiological experience, the new candidates will not find their path as rosy as would appear at first sight. In any case it seems a retrograde step to be subsidising would-be specialists when, to my knowledge alone, three qualified radiologists are unable to find work. Radiologists have many trials to undergo because their specialty is a junior one, but I am surprised that my senior colleagues have not resisted this unnecessary attempt to induce people to join their ranks, for it cannot enhance our prestige.

D.M.R.E.

HAD THE CERTIFYING DOCTOR KNOWN

SIR,—At a recent gathering of doctors at a steel works the topic of certification of employees in industry came under discussion, and the company had received an urgent request for help to manufacture a part for a war machine. The shortage of this component was causing a serious delay in supplies. It so happened that there was in one shop adaptable equipment but no skilled operatives available. In reviewing the labour force it was remembered that three men who were skilled at this type of work had been transferred several years before when orders were short to other departments. They were requested to report back the following week to their original shop. Two days later they presented medical certificates, each bearing a different doctor's signature, giving some reason for their not transferring to the operation required. I felt satisfied that the real cause of the trouble was not a question of health. The men had settled down to a new occupation with a fresh set of men, in surroundings which happened to be more congenial, and they were displaying the understandable and common dislike of being uprooted and disturbed. I interviewed the three men and they all seemed to be in normal health. I pointed out to them that, although the work that they were at present doing was of importance, the work to which they were requested to transfer was particularly urgent and vital and that their greatest utility value to the country on this occasion would be to return to their original occupation. Two of them, on considering these points, immediately volunteered to do as we wished. The third man disclosed that he had lost a sister and brother from tuberculosis and that as the original shop was certainly dustier than his present shop he did not want to return. It was apparent that his fear was quite genuine. It was, however, pointed out to him that if he had a liability to tuberculosis probably the shop that he was working in was not the most suitable: that open-air work would be preferable, and that in any event he ought to have enough courage to have an examination before it was too late for his doctor to help him. To this he reluctantly agreed and it was arranged that he should be examined by the local tuberculosis officer. The result of this examination was not reported, but ten days later the man presented himself for work in the occupation that he had been requested to take up, and he was a happier man than he had been for some years past.

That is what happened; but if this satisfactory conclusion had not been reached the problem would have

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been different. Even supposing twelve able-bodied men from the Ministry of Labour had been available—which was out of the question—it would have been fortunate if as many as three of them could have adapted themselves to the work, which calls for considerable dexterity and stamina; and those three men would have taken at least two or three months before they could have given the output that the original three men actually gave in a few days. I was urged to pass these particulars on to you. I do so, with some reluctance and with the feeling that had the certifying doctors known all the facts the situation would never have arisen. It is, however, worth considering how such events can best be avoided.

WORKS MANAGER.

Obituary

JAMES KERR

M.D. CAMB., D.P.H.

BY the death in Edinburgh on Oct. 5 of Dr. James Kerr in his 80th year the country has lost its Grand Old Man of school hygiene. It was in Bradford that he initiated what was to become a vast instrument of human welfare, and when the B.M.A. met there in 1924 the president described him as "a brilliant scholar who never realised how brilliant he was even when it was impressed upon him by others." But for his epitaph he would have chosen: "the first school medical officer for London."

James Kerr was born in Glasgow, educated at Manchester Grammar School, St. John's College, Cambridge (of which he became a fellow) and St. Bartholomew's Hospital, qualifying in 1887. He took up the double specialties of eye and ear surgery and after hospital experience at Swansea and elsewhere he started practice in Bradford. The school board of this town (Margaret McMillan was then a member of it) was the most progressive in the country and employed Kerr as consulting medical officer. He was thus the first medical man in England (with the possible exception of Clement Dukes) to pay attention to the physiological questions arising out of the practice of confining children within walls and seated at desks during long periods each day during a time of their life which should naturally be spent largely in activity in the open air. His investigations produced new and vital knowledge of the reactions of children to these artificial conditions and paved the way for the advances in school practice which took place in the first two decades of the century. The fruit of these early researches was published by the Royal Statistical Society, which awarded him the Howard medal, and in the Ingleby lectures delivered at the University of Birmingham.

In 1902 the school board for London, alarmed at the evidence of widespread defect among the elementary-school population, determined to create a medical department and Kerr was appointed as its head. He thus became the first whole-time school medical officer in the country and he made full use of the opportunity thus created. He possessed exceptional powers of leadership and gathered around himself a band of brilliant young specialists whom he fired with his own enthusiasm. His conception of school hygiene was broad and inclusive; medical inspection and treatment, with which the idea became linked in many minds, was for him far too narrow an interpretation. He thought in terms of the whole child and of its primary requirements, physical and mental, for a healthy life. His mind worked always as an educationist, rather than as an officer of the public health concerned primarily with the prevention of disease, and he had a keen understanding of the social implications of his work. Thus he created a school nursing service, started the open-air school movement, and engineered a series of reforms in educational methods. Slates and pencils disappeared, fine work in infants' departments was abolished, sewing by artificial light prohibited, sight-saving classes established, and personal cleanliness insisted upon. And on the work done in London under his direction were based the legislative enactments which later established the school medical service throughout the country. In 1911 the London County Council, which had superseded the school board as education authority, decided to amalgamate under one head all the medical services under its direction and Sir William Hamer thereupon became school medical officer. Henceforward until his retirement in 1926 Kerr occupied the post of research medical officer to the council and was freed from the trammels of office routine. He was then able to devote much of his time to literary work. He re-wrote Newsholme's "School Hygiene," the standard textbook on the subject; his life-long interest in the hygiene of the special senses found expression in a monograph on "School Vision and the Myopic Scholar"; and finally he published "The Fundamentals of School Health," a volume packed with concise information and revealing between the lines some of the idealist's dreams of the future.

After his retirement, spent in Edinburgh, Kerr's interest in school hygiene never flagged and many masterly reviews came from his pen. His mind remained acute and active to the end. During later years he identified himself with the care of the deaf in Scotland, becoming chairman of Donaldson's Hospital. He is survived by his wife and his son, Dr. Douglas Kerr, principal police surgeon to Edinburgh Corporation.

ARTHUR CHARLES SHELFORD

M.B. EDIN.; SURGEON LIEUTENANT, R.N.V.R.

Arthur Shelford was born in 1914 at the Duke's School, Alnwick, where he also received his early education. In 1932 he began his medical studies at Edinburgh University and he graduated M.B. in 1937. After holding resident posts at Sunderland Infirmary he joined the practice of one of his chiefs who writes of him: "Shelford was rather shy but the more one knew him the more one liked and respected him. He had sound principles of conduct and the character and will power to put them into practice. Conscientious and interested in his work he would have made an excellent practitioner, and many of his patients still talk to me about him. He was devoted to his home, Northumberland and the Cheviots." Dr. Shelford volunteered for the Navy at the outbreak of war and received his commission as a surgeon lieutenant at the end of 1939. Early the next year he was posted to H.M.S. *Express*, and during the week of the Dunkirk evacuation had some strenuous and exciting experiences. He was reported lost in September, 1940, and in July of this year the German authorities notified the Admiralty that he was buried on the island of Pellworm on Sept. 26, 1940.

Gladstone Adams, Whitley Bay

THE LATE PROF. AGNES COWAN

Dr. Agnes Cowan died at Cambridge on Aug. 22, 1940, after she had been invalided home from China, and her friends will welcome some notes of her career which we have now received. Agnes Marshall was the daughter of Sir John Cowan, well known as a steel engineer. She was educated at the University of Edinburgh where she qualified in 1906, and within a year of her graduation she set out for Ashiho, the most northerly mission post in Manchuria. Shocked by the misery and wastage of women's lives she began almost at once to tackle the barriers of ignorance and prejudice, and before she returned to this country during the last war she had built up at Ashiho a women's hospital and had trained women to carry on her work. Back in this country she served women again at the factories at Gretna and in the camps of the W.A.A.C.s. When she returned to China after the war she was called to Moukden to superintend the women's hospital and practise in her own specialty. The medical college appointed her to the chair of obstetrics and gynæcology, and lectures, all of which had to be delivered in Chinese, were added to her busy life. Her courage, integrity and wit appealed to the Chinese, and she counted their friendship as her reward for thirty years of service.

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Medical News

University of Cambridge

The title of the degrees of M.B. & B.Chir. has been conferred on J. I. Hallinan (Girton) and J. W. Shrimpton (Newnham).

In the examination for part II of the D.M.R.E. Dr. John Morton has been successful.

University of Sheffield

Dr. Margaret Happey has been appointed assistant bacteriologist, and Mr. F. Dickens, D.Sc. director of the Cancer Research Laboratory, Newcastle-on-Tyne, has been appointed external examiner in biochemistry for the Ph.D. Thesis. Prof. G. A. Clark has been elected to represent the university on the General Medical Council.

Royal College of Surgeons of England

At a meeting of the council held on Oct. 9, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. D. L. Kerr was admitted as a Macloghlin scholar.

Dr. John Beattie was appointed Bernhard Baron research professor. It was decided not to fill the post of Conservator of the Museum at present, and Dr. A. J. E. Cave, assistant conservator, will continue in charge for the time being.

Dr. A. D. Marston, L.D.S., was appointed an additional examiner for the diploma in anæsthetics.

A Prophit studentship has been awarded to Dr. J. Clark Davidson, and a Mackenzie Mackinnon research fellowship to Dr. Geoffrey Bourne.

It was decided to recognise the posts of resident surgical officer and of one house-surgeon at the Kent and Sussex Hospital, and of house-surgeon at the Walsall General Hospital, for the six months' surgical practice required of candidates for the final fellowship examination.

A diploma of fellowship was granted to Peter Smith, M.B. Lond., and diplomas of membership to François-Xavier Darne, J. D. C. Gowans, D. K. Sambrook, A. L. H. Smith and Glenys J. Wade. Diplomas in child health were granted, jointly with the Royal College of Physicians, to the following:

A. W. Abramson, W. W. Burnett, Winifred M. Davidson, W. G. Daynes, Mabel A. Henderson, S. L. Mohan, David Morris, Lorna C. Petersen, Gaya Prasad, I. D. Riley and Margaret M. Strange.

Royal Faculty of Physicians and Surgeons of Glasgow

At a recent meeting of the faculty, with Mr. Roy Young, the president, in the chair, the following were admitted to the fellowship:—

J. W. Ferguson (Gartcosh), H. R. MacLennan (Glasgow), Thomas Semple (Newton Mearns), and H. E. C. Wilson (Bearsden).

Medico-Legal Society

A meeting of this society will be held at 26, Portland Place, London, W.1, on Thursday, Oct. 23, at 4.30 P.M., when Dr. Thomas Christie, medical officer of Winchester Prison, will read a paper on the manic depressive psychoses in relation to the crime of murder.

Priority Milk

The Ministry of Food will allow priority claims on the supply of liquid milk up to two pints a day for periods normally not exceeding one month by the following people:

(*a*) Workers, including domestic workers, during an illness which temporarily incapacitates them for work.

(*b*) Persons suffering from an illness characterised by high and prolonged fever or from post-operative conditions after major operations.

(*c*) Sick children not attending school.

(*d*) Persons suffering from one or more of the following illnesses, whether incapacitated or not: Active tuberculosis of all types; silicosis, affection of the mouth, throat or gullet or organic nervous disorder causing interference with swallowing; gastric, duodenal or anastomotic ulcer; certain cases of dyspepsia due to conditions other than ulceration of the stomach or duodenum; colitis; diabetes mellitus; thyrotoxicosis; nephritis.

(*e*) Expectant mothers, who are allowed a priority claim of one pint a day until approximately one month after confinement.

A certificate signed by a medical practitioner will be required, except by an expectant mother, for whom the certificate of a certified midwife or health visitor will be accepted.

Infants between one and twelve months old who are being bottle-fed on cow's liquid milk will be supplied with up to 7 pints a week, in addition to their priority entitlement of 7 pints a week under the milk supply scheme. The additional quantities must be bought at the full retail price.

Memorial to St. Thomas's Masseuses

A war memorial fund is being formed in memory of the four staff masseuses who lost their lives when St. Thomas's Hospital was bombed in September, 1940. It is suggested that funds for four bursaries should be raised to help students in the physiotherapy department, to be awarded as follows:

In memory of Barbara Mortimer Thomas—primarily for a student from the Dominions.

In memory of Gwendolen Lockyer—primarily for the daughter of a medical practitioner.

In memory of Marguerite Doucet—primarily for the daughter of a past or present member of the Services.

In memory of Stephanie Dunn—primarily for the daughter of a clergyman.

Donations should be sent to Miss M. Randell, at the massage department of St. Thomas's Hospital, S.E.1.

Lister Medal

The Lister medal for 1942, which is awarded in recognition of distinguished contributions to surgical science, has been granted to Prof. Evarts A. Graham, professor of surgery in the Washington University (St. Louis, Mo.), and he will deliver the Lister memorial lecture in 1942, or later, under the auspices of the Royal College of Surgeons of England.

Royal Society of Medicine

On Tuesday, Oct. 21, at 2.30 P.M. at the section of comparative medicine Mr. H. W. Steele-Bodger, M.R.C.V.S., will open the first of a series of discussions on the general principles involved in a campaign to control diseases of cattle inimical to man. At 5 P.M. on the same day there will be a general meeting of fellows, and on Thursday, Oct. 23, at 4 P.M., the section of urology will hold a clinico-pathological meeting. On Friday, Oct. 24, at 2.30 P.M., Dr. Donald Paterson, Dr. Richard Dobbs, Sir Lancelot Barrington-Ward and Mr. David Levi will open a discussion at the section of disease in children on pyloric stenosis in infants. At 3 P.M. on the same day Dr. E. H. R. Harries will deliver his presidential address to the section of epidemiology and state medicine. He will speak on the trend of fever hospital practice.

Among the victims of German reprisal in Czecho-Slovakia is, we are informed, the chief of mental hospitals in Prague, Dr. F. Kafka, who was also director of the psychiatric clinic in the German University there.

Births, Marriages and Deaths

BIRTHS

BOUCHER.—On Oct. 6, at Woking Maternity Home, the wife of Dr. Anthony Boucher—a son.

BROWN.—On Oct. 8, at St. Albans, the wife of Dr. G. L. Brown—a son.

EDHOLM.—On Sept. 26, at Belfast, the wife of Dr. O. G. Edholm—a daughter.

GILBERT.—On Oct. 6, the wife of Dr. R. G. B. Gilbert, of Barnstaple—a son.

GURNEY.—On Oct. 8, at Windsor, the wife of Captain James Gurney, R.A.M.C.—a son.

HAMILTON.—On Oct. 11, at Monk's Orchard, Beckenham, the wife of Dr. J. G. Hamilton—a son.

INNES.—On Oct. 6, at Liverpool, the wife of Mr. Alexander Innes F.R.C.S.—a son.

SWAYNE.—On Oct. 3, at Hitchin, to Dr. Margaret Swayne, (née Peggy Blenkin), wife of Captain D. H. Swayne, R.A.M.C.—a son.

TEMPLETON.—On Oct. 1, at Midhurst, Sussex, the wife of Dr. William Templeton, of Chichester—a son.

MARRIAGES

BELLIS—RICHARDS.—On Oct. 11, at Leicester, Gordon Worsley Bellis, L.R.C.P., Flying-Officer R.A.F.V.R., to Barbara Irene Richards.

BOOTH—DENNY.—On Oct. 11, at Sydney, Robert Philip Booth, M.B., surgeon-lieutenant, R.A.N., to Winifred Daphne Denny.

DUERDEN—ALLAN.—On Oct. 11, at Port Glasgow, John Wilson Neander Duerden, M.B., captain, R.A.M.C., to Grace Pride Allan.

LEDWARD—COLYER.—On Oct. 11, at Charing, Alexander Davenport, Ledward, M.B., lieutenant, R.A.M.C., to Margaret Leith Colyer.

MACALPINE—HIRSCHMANN.—In October, George Lawson Macalpine, of Accrington, to Ida Hirschmann, M.D., formerly of Harley Street, London.

MACARTNEY—CAREY.—On Oct. 11, at Bromley, Kent, James Norman Macartney, M.D., major, R.A.M.C., to Phyllis Susannah Carey.

DEATHS

MILL.—On Oct. 8, at Keswick, Thomas Mill, C.M.G., C.B.E., M.B. Edin., F.R.C.S.E., F.R.A.C.S.

O'CONNELL.—On Oct. 2, at West Moors, Dorset, David Valentine O'Connell, M.D.R.U.I., D.P.H., colonel, late R.A.M.C., aged 83.

THURNAM.—On Oct. 8, at Hayle, Cornwall, William Rowland Thurnam, M.D. Durh., founder of Nordrach-upon-Mendip.

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Notes, Comments and Abstracts

BLOOD TRANSFUSION IN THE FINNISH WAR

Dr. Erik Unonius and Dr. Inga Schröder (*Nord. Med.* 1941, **10**, 1046) tell us something of the problems encountered by the Finnish blood-transfusion service in the Russo-Finnish (as distinct from the Finno-Russian) war. Many of the donors moved away from their homes during the early months of war and it became necessary to enrol new ones in large numbers in order to have a supply available for emergencies. Donors are only accepted if the results of general examination, Wassermann and Kahn tests, and the sedimentation-rate are favourable. Blood is taken directly into the transfusion apparatus. Vichy-water bottles fitted with a special stopper were found to be satisfactory for the purpose. The donor's hæmoglobin was estimated before the blood was taken, and it was found that the figure did not return to normal within 7 weeks of blood-taking. The rate of restoration varied greatly between donors. Men between 26 and 35 and women between 35 and 45 made up the loss most quickly, though elderly donors tolerated the loss of blood well. Only group O blood was sent to the front, since grouping was impossible there. Blood of other groups was used at the base hospitals as far as possible. In field hospitals and casualty stations a mixture of equal parts of blood and normal saline was found to be the most useful for transfusion. Stored blood showed similar changes whether treated with citrate or heparin. The red cells were very resistant, but the whites disintegrated rapidly. After 5 weeks the red cells were only down by 14%, but after a fortnight there were no undamaged white cells left. According to Unonius and Schröder the destruction of white cells releases albuminous products in the blood which may account for the rigors occasionally seen. The sedimentation-rate decreased rapidly, and after 2 weeks was 0 mm. in one hour (Westergren). Blood-sugar fell quickly to a third and then remained constant. The hæmoglobin percentage fell a little in the first week and then became steady. Blood stored for 3 months was used for transfusion in two cases with no ill effects.

HE'S A GOOD BOY

THE Cockney mother who went to the police-court to plead for her son put the idea of the Hawkspur camp in a nutshell: "He's a good boy, yer honour, bar what he does." But in "The Hawkspur Experiment" (Geo. Allen and Unwin. Pp. 192. 6*s*.) Mr. David Wills describes in greater detail the attempt made at this voluntary camp of 70 youths to find a solution for delinquency not in discipline from without, but in control from within. The workers at Hawkspur went all out to show the boy that though they could not always approve of what he did they always very much approved of him. The Q Camps Committee, which continues to work among evacuated children, started the camp in May, 1936. When in January, 1940, the war made it impossible for the camp to carry on it was still chronically short of funds and officially unrecognised. But it had the germ of a great idea and Mr. Wills tells an enthralling story of pioneer effort. The various forms of government adopted by the campers is in itself an instructive study of constitutional history. The work of diagnosing the members of the camp was carried out by a selection and treatment committee, mainly composed of medical psychologists—though Mr. Wills is careful to explain that he himself writes as a Christian and not as a psychologist—and the Institute for the Scientific Treatment of Delinquency gave a physical and psychometric examination as well as a psychiatric interview to each boy. Happiness is a human birthright and delinquents are among those who have not found it; Mr. Wills feels we should meet them not with retribution or punishment, but with treatment inspired by love.

CONTRACEPTIVE TECHNIQUE

WHATEVER his views on the ethics of contraception the doctor needs to be well informed about its practical aspects, for sooner or later he is sure to be called on to give advice on them. Many recently qualified men and women have been dismayed by their own ignorance when a patient asks for instruction on an efficient method of preventing conception. In the medical curriculum the subject is avoided, so that the young doctor is at a loss for theoretical data, and the patient's practical knowledge of the subject may be better than his own. What is the safest, most reliable, least distasteful and cheapest method of contraception? To answer these important questions Dickinson and Morris have produced a concise well-illustrated booklet.[1] All methods, good or bad, are reviewed; such dangerous devices as the Gräfenburg ring and the wishbone pessary are mentioned to be condemned. All gynæcologists recognise the dangers of infection and perforation from these two methods, which are not in any case certain preventives of conception since fœtus and ring have been seen occupying the same uterine cavity. The authors favour the condom for its simplicity, and the diaphragm pessary, but insist that both should be fortified by the concomitant use of a reliable spermicidal jelly. They do not advocate postcoital vaginal douching, since it is unreliable and must be used immediately if it is to confer even a minor degree of protection. They point out the dangers of using too strong a solution; most gynæcologists will recall cases of serious lysol or perchloride burns from this cause. There are short chapters on permanent sterilisation in the male and female, and an appendix on the organisation of a contraceptive clinic. The booklet will be useful to the man in practice and the final-year student.

VINEGAR AND CIRRHOSIS

A CORRESPONDENT tells us of his sister who died some years ago from cirrhosis of the liver which the hospital physician thought to be alcoholic. In fact the lady was almost a teetotaller, but she did take a great deal of vinegar, both poured over other food and as a drink. The correspondent suggests that the vinegar may have been the cause of the cirrhosis. The composition of vinegar varies, but apparently it may contain in addition to the main constituent, acetic acid, small quantities of formic and tartaric acids, free mineral acids combined sulphate, phosphates, caramel, sulphur dioxide and iron. The acetic acid is converted into acetates and these are quickly oxidised to carbonates and bicarbonates which do no more than alkalinise the urine. Some vinegars are fortified with sulphuric acid, but this should not be harmful in the doses likely to be taken. It does seem possible however that in large amounts vinegar may produce a chronic gastritis, and on one view of the ætiology of cirrhosis this would open the way for bacteria to reach the portal circulation and might lead to cirrhosis. The habit of drinking vinegar is much more common in women than in men, and some women take it as a slimming remedy. They may perhaps drink enough of it to produce a mild gastritis which robs them of their appetite. But the chapter is now closed, for slimming is out of fashion and vinegar is getting as scarce as whisky.

WEEK-END COURSE IN WAR MEDICINE.—A course in war medicine will be held at Shrewsbury Military Hospital on Oct. 25 and 26. Besides medical and surgical rounds the course will include lectures and demonstrations on eye injuries, gastroscopy, plastic ear nose and throat surgery, oxygen therapy for resuscitation and anæsthesia in the field.

MEDICAL CASUALTIES.—In recent casualty lists Colonel Cyril Popham, L.R.C.P.E., R.A.M.C., and W.S./Captain E. A. Robertson, M.B. Glasg., R.A.M.C., were posted as wounded. Lieutenant J. Campbell, M.B., R.A.M.C., is reported to be a prisoner of war.

Appointments

ALLISON, P. R., Ch.M. Leeds, F.R.C.S.: hon. surgeon to the thoracic-surgical department, Leeds General Infirmary.

FINE, WILFRED, M.B. Lond.: R.M.O. at Alcester Hospital, Warwickshire.

SHAND, G. E., M.D. Aberd., D.P.H.: temp. asst. M.O.H. for Portsmouth.

WATSON, H. B., M.B. Birm.: R.S.O. at Solihull Hospital, Warwickshire.

WILSON, JOHN, M.B. Leeds: R.S.O. at Grimsby and District Hospital.

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1. Techniques of Contraception Control. By R. L. Dickinson, M.D., and W. E. Morris, M.D. Baltimore: The Williams and Wilkins Company. Pp. 56.

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ORIGINAL ARTICLES

A PLEA FOR GRADUATION AT AN EARLIER AGE

A. SPENCER PATERSON,
M.A. OXFD, M.D. EDIN., F.R.C.P.E., M.R.C.P., D. PSYCH.

THE purpose of this paper is to discuss certain psychological and sociological aspects of the present system of medical education. In what follows, I am not referring to any particular medical school, for I have had intimate experience of various universities not only in England but on the continent of Europe and America as well.

Before this war the authorities were anxious that a medical student before graduation should not only be proficient as a doctor but should also have a good general education and knowledge of the world. They therefore decided that the student should start his training late (18–19), have a longer medical course (6–7 years), and later take house jobs (1–2 years). Further, with the growing tendency to specialisation, a trip abroad would take another year, and so finally, after perhaps another year or two, he might be able to settle down at the age of about 30. Now while everyone will allow that the highest possible degree of professional efficiency and general culture is desirable in the profession, it will, I think, be apparent that this programme is not the best way of attaining it. In the first place it takes not 6 or 7 years to make a good doctor but 30 or 40 years, and the real points at issue are at what age we are to allow the boy to become a man, and at what age he is to be given a degree and encouraged to settle down and have a home of his own.

The main contention of this article is that the average medical student should begin his university studies at the age of 16, and also to cite several well-recognised psychological and sociological principles in its favour. This is nothing new, but a return to a much sounder system which has now been given up for some years. It is generally agreed that education in Scotland has always been of a high standard, and it is worth while comparing the life of a medical student 12 years ago at Edinburgh with that which appears to hold elsewhere today.

WHEN STUDENTS GRADUATED AT 21

Many youths started their course at 16. Matriculation at such an age ensured that it was the cleverer boys who took up medicine, a fact which augured well for the future standing of the profession. Again, the tremendous number of scholarships coupled with the fact that the youth could graduate at 21 meant that ability rather than the state of the parents' finances determined the selection of future doctors. The boys had already had a good grounding in biology and often were proficient in at least one foreign language. If a real love for learning is to be instilled, this will have occurred long before the age of 16.

It is a psychological fact that the intellect of a boy of 16 has already been mature for 2 years and there is nothing that a boy of 18 can learn that is beyond the scope of one of 16. It does not appear that the years from 16 to 18 are very usefully employed, for either the student learns the subjects for the first M.B., which he later re-learns at the university, or else he studies the classics. This last subject seems of very little help in any way. While it is essential if one is to master the English language that one should learn another as well, that second language ought to be a modern one. Demosthenes wrote tolerably good Greek, and Cicero Latin, although neither had been made to study Sanskrit. I have discussed the value of the classics with others who, like myself, have taken Honours Greats at Oxford, and the common view is that however valuable the complete university course a smattering of Latin and Greek is scarcely worth the trouble. It does in fact contravene the law of "transfer of training," which states that the learning of one unrelated subject does not make it easier to learn another.

On the other hand the student of 16 is much more enthusiastic and pliable. If the authorities are afraid that the raw country lad will make an uncouth doctor, the obvious reply is "Send him to college when he is 16 and not 18, and then he will be more susceptible to the cultural influences of the university." These younger students did in fact take advantage of contacts outside medicine. They mixed with students of other nations and with those in other faculties. Apart from the university union, a student could discuss political and literary topics in the hall of the Speculative Society where Walter Scott and later R. L. Stevenson had once sat as secretaries, or argue medical problems in the Royal Medical Society, which Darwin and Lister had frequented in earlier days. There were especially friendly relations between teachers and students, including a convivial banquet held once a year in the Royal College of Surgeons or Physicians. Such cultivation of sentiment, and appeal to tradition, counteracted any tendency of the university to become a mere cramming institution.

I have often heard it said that no-one would recognise the raw country lad of 16 in the cultured graduate of 21, now hardly distinguishable from his fellow students who had been at Fettes or such other public school. In order further to ensure that Scottish medicine should be imbued with culture in the widest sense there were a few scholarships to enable graduates in classics and philosophy or pure science to take up medicine, and this practice might well be introduced in England. The atmosphere of the university was remarkably free from the parade of pseudo-opulence which surrounds some medical centres. My chief, a renowned neurologist, did not possess a motor-car, while the senior surgeon arrived daily at the university on a push-bicycle.

While there is no psychological difference between 16 and 18, except the greater pliability and enthusiasm at the former age, there is a vast difference between 21 and 23 as the best age for graduation. The youth who has begun at 16 is more easily absorbed in the activities of the university, and he tends to postpone his interest in affairs of the heart to a later date. Under the present-day system, however, the student appears to experience a definite sense of frustration after 21. The medical course seems to be endless. This leads to emotional conflicts, and to friendships in many cases with women who in personality and status are inferior to those whom he would choose if he were frankly contemplating matrimony. These clandestine associations, which defy convention and morality, tend to dispel that idealism which is so necessary in the young doctor and substitute an unpleasant brand of cynicism. In other cases the sense of frustration leads to a taste for tavern life or may reactivate some latent abnormal sexual trend. It is tiresome for psychiatrists to have to treat resultant breakdowns which a more rational system of teaching would obviate.

NURSES

An analogous state of affairs exists in the nursing profession. The girl of 15 or 16 has already been intellectually mature for one or two years, and there is nothing which a girl of 19 can learn of which her sister of 15 is incapable. Many suitable girls of 15 desire to become nurses, but because (in some schools) they have to wait till 19 they go into other occupations and stay there. Yet the girl of 15 is so pliable and enthusiastic that the atmosphere of a great nursing college could completely captivate her until she was 20. She will by that time have mastered a profession which will stand her in good stead as an insurance policy against any possible accident to her husband in later years. If a girl starts nursing at 19 she feels as if she is taking the veil. She will finish her training at 24 or 25 and all this time she has the unhappy feeling that the best years of her life are slipping away. This of course only applies to the average nurse. There will always be some excellent women who feel that nursing is their vocation and who have determined to remain as such throughout their whole life.

The objection that the public will not have confidence in a young doctor or nurse rests on the most superficial psychological grounds. Indeed, the nurse's uniform appears to be designed to make her look 10 years older than her age, a fact which favours the girl of 16 but greatly depresses the girl of 26. A youthful manner results from mental rather than physical factors, and the

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graduate at 21 who has been treated as a man and not as a boy will feel and look mature.

EARLY MARRIAGE AND THE STATE

Up till now the authorities appear to have considered this problem purely from the individual's point of view. Yet it is impossible to overestimate its importance from the point of view of the state. With the tendency to postpone marriage into the thirties, the medical man is compelled to have a small family. The reader will no doubt recall that most doctors of his acquaintance, and particularly specialists, are either bachelors or else have only one or two children. If the family of two children comes to be considered normal, the day of England as a world-power is past. Any country whose families average four children, given anything like equal conditions, is likely to oust one like ours, whose birth-rate replaces the present population by only 75%. There is less incentive to fight to preserve freedom if this is to benefit not our own children but those of immigrants from a neighbouring neutral island or from Eastern Europe. Since earlier marriage in the community always means a higher birth-rate, a heavy responsibility rests with any legislating body which encourages late marriage such as at present obtains in the medical and nursing professions.

TRAUMATIC ANEURYSM OF POSTERIOR TIBIAL ARTERY, WITH FOOT-DROP

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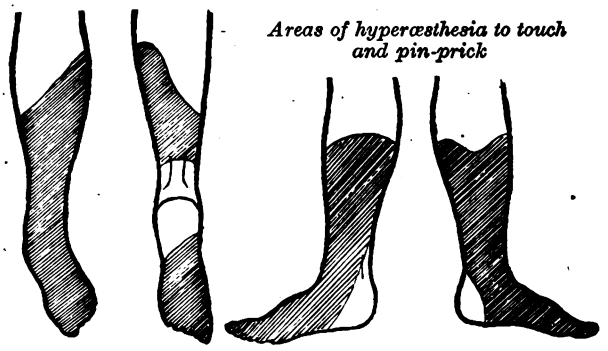
THE case which we are describing followed a bullet wound of the leg and showed not only the features of a traumatic aneurysm but also foot-drop. Owing to the proximity of the wound to the external popliteal nerve, trauma to the nerve was at first considered to be the cause of the paralysis. Had it been recognised that ischæmia might have damaged the external popliteal nerve the aneurysm might have been found much earlier.

The development of an efficient, or more than efficient, circulation in a limb several months after an injury producing an aneurysm has been recorded by Lewis (1940) and Holman (1940). It is well exemplified by the course of this patient immediately after operation, when it seemed that in addition to the obvious aneurysm of the posterior tibial artery the anterior tibial artery might also be affected. A well-defined area of hyperæsthesia in the leg, distal to the aneurysm, was present before operation and persisted; its genesis is difficult to explain.

CASE-RECORD

A man, aged 20, was wounded near Dunkirk on May 27, 1940. The upper part of his right leg was penetrated obliquely by a rifle bullet entering the outer side near the neck of the fibula and emerging in the middle of the calf behind. There was considerable arterial bleeding from both wounds and the soldier showed great ingenuity in constructing a tourniquet from his lanyard and jack-knife when he found that the first field dressing failed to stop the bleeding. Three days elapsed before he reached the base hospital in Britain, and during this time he had considerable pain in the leg and complained of coldness in the foot. His wounds were healing satisfactorily and radiography showed a comminuted fracture of the head of the tibia; the leg was immobilised in plaster. Attempts to walk in the plaster produced so much pain and cramp in the region of the exit wound that the plaster had to be removed. Further attempts at immobilisation in plaster had to be abandoned because of the same symptoms. It was now discovered that he could not dorsiflex his foot although some power of dorsiflexion of the great toe remained. The dorsum of the foot and the region just above the ankle felt numb. Splinting the leg and massage resulted in considerable improvement of the foot-drop, but general aching in the leg and foot persisted, and there was occasional slight swelling of the foot. He was discharged to duty in September. The pain in the leg on walking and standing led to his readmission to hospital. At this time, 3½ months after the injury, he noticed an area tender to touch about the size of the palm of the hand just above the outer side of the ankle. This region felt bruised and when it was tapped pain like an electric shock shot down to his big toe. In addition, this observant patient had noticed for 6 weeks an increased pulsation at the back of the right knee.

On admission under our care in February, 1941, with an infection of the upper respiratory tract, he mentioned an aching pain in the right calf and foot on walking and an occasional sharp pain shooting from the ankle to the big toe while sitting still. The right calf was 1½–2 in. larger in girth than the opposite leg. The healed entrance wound was situated in front and slightly medial to the neck of the fibula and the exit wound was in the middle of the calf about 5 in. below the bend of the knee. The track had extended downwards, inwards and backwards, passing immediately below the tibiofibular joint through the interosseous membrane. Pulsation of the calf was visible just above the exit wound and the veins were more prominent in that leg. There was a somewhat localised expansile pulsating swelling 1–1½ in. long, extending upwards from the exit wound. A thrill clearly felt over the swelling extended to the upper limit of the popliteal space and could be felt in the posterior tibial artery at the ankle. Pulsation in the femoral artery at the groin was more easily felt on the right side. A loud high-pitched murmur, systolic in time, was heard 2 in. higher and a little lower than the limits of the thrill. It was particularly loud in the popliteal fossa and over the external malleolus, possibly owing to bone conduction in the latter situation. The systolic blood-pressure taken at mid-thigh was 225 mm. Hg, but the diastolic pressure could not be recorded by auscultation; the pressure in the left thigh was 185/105 mm.



Areas of hyperæsthesia to touch and pin-prick

A sharply demarcated and constant area of hyperæsthesia to touch and pinprick is shown in the figure by shading. There was no difference of temperature between the two feet on ordinary examination but the right foot became redder than the left when dependent. The right foot could be dorsiflexed almost to a right angle but the power was still diminished. There was no cardiac murmur nor enlargement of the heart and the general condition of the patient was good. The radiogram showed no evidence of fracture but erosion of bone on the opposing surfaces of the tibia and fibula just below the superior tibiofibular joint.

Operation.—The limb was exsanguinated and a tourniquet applied across the upper third of the thigh. A midline incision from the upper part of the popliteal fossa to the outer margin of the tendo achilles was used. The structures of the popliteal fossa were dissected clear and there was no evidence of damage to the nerves. The vessels in the posterior compartment of the leg were exposed by dividing gastrocnemius in the line of its fibres and the tendon of plantaris, and by incising soleus. A sac, densely adherent to surrounding muscles and to the posterior tibial and the branches of the internal popliteal nerve, was separated. This sac, the size of a walnut, interrupted the course of the posterior tibial artery for about 2 in. and the posterior tibial vein was obliterated in its wall; the upper extremity was about ½-in. distal to the bifurcation of the popliteal artery. The anterior and posterior tibial arteries were of equal size. In attempting to free the deeper portion of the sac it was soon apparent that a larger part of the aneurysm lay deep to the plane of the interosseous membrane and coincided in site with the erosion of bone seen by X rays. The upper border of this deep part lay snugly under the lower fibres of popliteus. The posterior tibial vessels were ligated above and below the sac and the hour-glass-like aneurysm removed. Severe hæmorrhage resulted on release of the tourniquet and it was feared that the anterior tibial artery was also affected. Bleeding was controlled by pads of gauze stepped up in size and liberally soaked in turpentine. The skin was lightly sutured. There

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was an adequate circulation in the limb immediately after operation. The wound suppurated but the infection quickly subsided after the removal of the pack and Vaseline-gauze drainage. The wound was closed 21 days after operation.

The specimen consisted of two dilated portions connected by a narrow neck. The posterior sac was relatively smooth and thick walled but the larger anterior part was friable and thin and had relied for its support on direct apposition with bone. Histologically the smaller of the sacs was arterial in origin and the larger was purely connective tissue, the whole conforming to the picture of a traumatic arterial aneurysm.

DISCUSSION

The history of arterial bleeding at the time of injury followed by coldness of the foot and severe pain, like intermittent claudication, in the calf on walking indicated arterial damage. We did not make observations to differentiate between traumatic arterial and intravenous aneurysm as outlined by Holman (1928) and Porter (1938). The two may be distinguished by measurement of the venous pressure in the limbs; the rate of blood-flow and oxygen content in the veins; and observations on the pulse-rate following pressure over the aneurysm sufficient to obliterate the thrill (Branham's phenomenon). The absence of cardiac murmurs and decompensation and the systolic timing of the thrill indicated a traumatic arterial rather than an arteriovenous aneurysm (Makins 1919, and Hoover 1924). The blood-pressure readings in the femoral arteries differ widely (right 225/? and left 185/105 mm. Hg). It is difficult to see how the systolic pressures can differ on the two sides; the diastolic pressure on the right by auscultatory methods gave a reading of nil. The blood-pressure distal to the region was not recorded.

Treatment had been directed for many months to the partial external popliteal palsy without the aneurysm being suspected. Although the track of the missile was near branches of the external popliteal nerve it had not directly damaged the nerve; nor was the aneurysmal sac in contact with the nerves. It is, however, well known that nerves may be actually traumatised by the lateral explosive force of a missile. Is it possible to explain the popliteal palsy on the basis of ischæmic damage to the nerve? It is probable that there was ischæmia of the leg during the development of the arterial hæmatoma and Lewis (1936) has shown that nerves recover after 12–20 hours ischæmia, the recovery being slow and dependent on regeneration. The area of hyperæsthesia of the leg does not correspond to the distribution of somatic nerves, and clinically the condition resembled minor causalgia. This state is common after injury to blood-vessels (Homan 1940) and is considered to be a reflex phenomenon from the injured segment of artery. The hyperæsthesia in this case has persisted after removal of the aneurysm.

Holman recommends operation without a tourniquet. It is true that one might thus appreciate better the size of the vessels involved but it seems easier to be able to open the aneurysmal sac at once and quickly explore its limits. The method of arresting bleeding in an inaccessible part of a limb by using small pieces of gauze graduated in size (Billroth pack) and soaking these in turpentine, as recommended by Grey Turner, probably saved the patient's limb. Holman (1940), in reporting 8 successful cases of operation for aneurysm in the limb, noted that provided the aneurysm has been present for some months there is no danger of gangrene after its removal.

SUMMARY

A case of traumatic aneurysm of the posterior tibial artery with associated foot-drop is described.

We consider that the nerve paralysis resulted either from ischæmia or from the lateral explosive force of the missile. The nerves were normal in appearance and well away from the aneurysmal sac.

Hyperæsthesia of the leg persisted after removal of the aneurysm.

The lapse of 9 months after injury made it certain that there would be an adequate blood-supply after operation.

The Billroth pack and turpentine were found to be of value in arresting hæmorrhage.

We are indebted to Colonel F. Whalley for permission to publish this case.

References at foot of next column

EFFECT OF CALCIUM IN A CASE OF AUTOHÆMAGGLUTINATION

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AUTOHÆMAGGLUTINATION is usually regarded as synonymous with non-specific cold agglutination or panagglutination of Mino—i.e., the clumping which is sometimes observed when red cells are mixed at 0–5° C. with serum from the same person. The use of the word is discussed fully by Wiener (1939). In rare cases this clumping also occurs at room temperature, and Boxwell and Bigger (1931) were in favour of restricting the term to agglutination at this higher temperature. Their paper included a review of 22 authentic cases of the condition which had been reported before 1931. They were careful to exclude pseudoagglutination or excessive rouleaux formation and the Thomsen phenomenon, which is agglutination caused by bacterial action. McCombs and McElroy (1937) obtained records of 38 authentic cases; 5 of the subjects were in normal health, while in many others the condition was associated with either anæmia or some interference with the function of the liver, as shown by jaundice and enlargement of the liver. Greenwald (1938) described autohæmagglutination in a case of acute hæmolytic anæmia, and noted the occurrence of autohæmagglutination in pernicious and other severe anæmias, acholuric jaundice, paroxysmal hæmoglobinuria, severe pneumonias and staphylococcal septicæmia. Gray, Greenfield and Lederer (1940) reported a fatal case of benzene poisoning associated with definite autohæmagglutination which occurred "only at a temperature below that of the body. The effect of the autoagglutinin was eliminated by heating the patient's serum and cells to body temperature." Dockeray and Sachs (1941) observed autohæmagglutination in a case of acute megalocytic anæmia.

We have recently had a case of autohæmagglutination which differed in some respects from the one described in detail by Boxwell and Bigger, and also presented certain features which have not hitherto been reported.

CASE-RECORD

A male laboratory assistant, aged 27. Mother died of heart failure. Father, two brothers and one sister alive and well. One brother had attacks of urticaria during childhood and now suffers from severe hay-fever every summer. Neither father (group A) nor one brother (group O) showed autohæmagglutination. Patient had been in good health for years, but in childhood had frequent attacks of urticaria, angioneurotic œdema, gastro-intestinal disturbance and headache. Recently had only once suffered from mild urticaria, weals being confined to left leg. Last attack of severe abdominal symptoms and headache was in 1938; on account of associated dyspnœa pneumonia was suspected, but none was detected, so symptoms thought to be allergic in origin. Responsible allergen not discovered. Angioneurotic œdema, with swelling of lips, used to occur almost weekly, but only two minor attacks during past year. No history of jaundice, hæmaturia or hæmoglobinuria, chilblains, anæmia, asthma or hay-fever.

Attention was first directed to condition by chance observation that patient's serum, which belonged to group O, agglutinated not only groups A and B cells, against which group O serum is usually tested, but also group O cells which are seldom used for test purposes with group O serum. Altogether, patient's serum was tested against cells of 15 group O subjects and produced agglutination in every instance at room temperature; also agglutinated cells of groups AB, A and B and of patient himself. In most instances cells were obtained by taking few drops of blood into 1% sodium citrate solution, and were *unwashed*. Less definite clumping occurred when blood was added to patient's serum direct, without use of

MAJORS MACPHERSON AND SHUCKSMITH: REFERENCES

Holman, E. (1928) *Surg. Clin. N. Amer.* **8**, 1413.
— (1940) *Ann. Surg.* **112**, 840.
Homan, J. (1940) *New Engl. J. Med.* **222**, 870.
Hoover, C. F. and Beans, A. J. (1924) *Arch. intern. Med.* **33**, 8.
Lewis, T. (1936) Vascular Disorders of the Limbs, London.
— (1940) *Clin. Sci.* **4**, 277.
Makins, G. H. (1919) Gunshot Injuries of the Blood Vessels, Bristol.
Porter, W. B. (1938) *Amer. J. med. Sci.* **198**, 75.

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citrate solution as anti-coagulant. Patient's serum and unwashed citrated cells (1% sodium citrate) were warmed in incubator for 1 hr. at 37° C., and were then mixed together. Agglutination was not observed even after mixture had stood for ½ hr. at incubator temperature. When tube was transferred to room temperature, or to cold room at 4° C., there was well-marked clumping within ½ hr. Reaction was reversible, for when tube was again warmed under hot water tap clumping disappeared, to reappear on cooling to room temperature.

The case thus conforms to Boxwell and Bigger's definition of auto-hæmagglutination—"a clumping of erythrocytes into irregular masses, visible to the naked eye, occurring in the presence of the individual's own serum, without bacterial action, at air temperature and reversible at body temperature."

Films were easily made from F. H.'s blood and the cells could be counted without difficulty. The blood-count was normal.

EFFECT OF WASHING PATIENT'S RED CELLS

Various experiments were carried out with the patient's cells, plasma and serum, the more important series being shown in the table. The results of all the experiments are summarised as follows:

1. Patient's cells, suspended in citrate saline without washing, are agglutinated at room temperature by his own serum or plasma, and by the serum of normal people. This reaction is reversed by warming at 37° C.
2. His cells, after washing and suspending in saline, are agglutinated as before by his own citrated plasma, but not by his serum or heparinised plasma or by the sera of normal people.
3. If his washed cells are suspended in citrate saline, agglutination occurs with his own serum. The reaction is inhibited by the addition of calcium chloride.
4. No agglutination of his washed cells occurs, even in the presence of citrate, with the sera of normal people.
5. His serum agglutinates normal group O corpuscles if they are suspended in citrate saline, but not if washed and suspended in saline.
6. It appears therefore that the patient's serum contains an agglutinin active against red cells at room temperature and inhibited by the presence of ionised calcium or by warming to 37° C.

EXPERIMENTS WITH SERUM AND CELLS OF PATIENT (GROUP O) AND FROM NORMAL PEOPLE (GROUPS AB, A, B AND O)

Serum	Cells	How treated	Reversible agglutination
Pt	Pt	Whole blood in citrate	+
Pt	O	Whole blood in citrate	+
AB	Pt	Whole blood in citrate	+
A	Pt	Whole blood in citrate	+
B	Pt	Whole blood in citrate	+
O	Pt	Whole blood in citrate	+
AB	Pt	Washed in saline	0
A	Pt	Washed in saline	0
B	Pt	Washed in saline	0
O	Pt	Washed in saline	0
Pt	Pt	Washed in saline	0
Pt	O	Washed in saline	0
Pt	Pt	Washed in citrate	+
O	Pt	Washed in citrate	0
Pt	Pt	Washed in citrate + $CaCl_2$	0
Pt	Pt	Washed in heparin	0
Pt	Pt	Washed in hirudin	0
Pt	Pt	Washed in chlorazol fast pink	0
Pt	AB	Washed in saline	+ 1 in 160*
Pt	A	Washed in saline	+ 1 in 160*
Pt	B	Washed in saline	+ 1 in 80*

* True isoagglutination.

DISCUSSION

The outstanding features of our case are that the serum will agglutinate the cells in the presence of a trace of citrated or oxalated plasma, which may either be on the surface of the cells at the time of mixing or be added separately. Clumping takes place over a wide range of temperature, but not at body temperature, and it is reversible, for it disappears on warming to 37° C. and reappears on cooling. The patient's serum will not agglutinate his cells if they are washed in saline, but only if they are washed in citrate or oxalate, or if, after washing in saline, they are re-suspended in citrate or oxalate.

Certain inferences may be drawn from these observations. In the first place, agglutination is potentiated by something present in plasma but not in serum—the citrate (or oxalate), the fibrinogen, the prothrombin or some unknown factor. But since agglutination occurs if the serum is mixed with washed cells that have been re-suspended in citrate or oxalate, citrate or oxalate must be the activating factor. Heparinised plasma fails to induce clumping in mixtures of our patient's serum and saline-washed cells. These observations suggest that citrated or oxalated plasma produced their effect either by some direct action of the citrate or oxalate or because the latter inactivate calcium. We adduce evidence that calcium may be the inhibitor of agglutination, and that agglutination will only take place when it has been inactivated by citrate or oxalate.

The autohæmagglutination observed in our patient is clearly different from that described by Boxwell and Bigger; although no details are given in their paper of the method of washing, the cells of their patient were still clumped after washing in saline, whereas washing in saline eliminated clumping of our patient's cells. Boxwell and Bigger also washed in saline the cells of persons of various groups, and state that agglutination of all these samples of saline-washed cells by their patient's serum "occurred almost immediately and was very marked." Again, Boxwell and Bigger's patient was ill with anæmia and jaundice at the time of investigation, whereas our patient was in good health. While under observation, however, he developed one of his rare attacks of angio-neurotic œdema with swelling of the lips, but the degree of autohæmagglutination did not appear to be influenced in any way by this.

Rous and Robertson (1918) described an interesting auto-agglutination in rabbits which received almost daily transfusions of citrated blood from other rabbits. The active principle circulated with the corpuscles, and only became effective at a temperature several degrees below that of the body. Clumping was first observed on cooling defibrinated blood to 35° C., was well marked at room temperature, and still more so at 0° C. The change was rapid and completely reversible, for the clumps disappeared at 35–36° C., to reappear on subsequent cooling. Intravascular clumping was observed by applying a tourniquet to the rabbit's ear and thus producing a considerable fall in temperature. The plethora due to the injections was sometimes succeeded by severe anæmia, possibly due to accidental chilling and lysis; no adequate search for a hæmolysin was made at this time. Rous and Robertson did not discuss whether the citrate in the whole blood which was injected had anything to do with the agglutination. In a subsequent paper (Robertson and Rous 1918) they described the induction of autohæmagglutination by another method—by repeated withdrawals of blood from rabbits—and stated that a similar clumping was sometimes associated with the anæmia of malnutrition.

In the reports of human cases, autohæmagglutination has often been associated with normal health, although anæmia or some abnormality of liver function has made it more obvious. Our own patient is healthy, although of an allergic diathesis, and his blood examination shows no abnormality. The condition in this instance does not appear to be familial. There is no evidence that his health would suffer if he were exposed to sudden chilling, since the presence of calcium in vivo should prevent the reaction.

Although an error in grouping was not made in our patient, who belongs to group O, there is a possibility that autoagglutinators of groups AB, A or B might be grouped incorrectly as group O. If a *serum* undergoing test agglutinates corpuscles of groups A & B, one ought not to assume that the patient belongs to group O unless the test is repeated at 37° C. and the same result obtained. Agglutination of A and B corpuscles at room temperature, but not at 37° C., signifies that the subject belongs to group AB; if group A corpuscles only are agglutinated at 37° C. the serum under test belongs to group B, and if group B corpuscles only are agglutinated the serum is group A.

There is also another possibility of error. If *unwashed cells* of an autoagglutinator are used in the ordinary grouping test they would be agglutinated by the trace

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of his own plasma in the presence of the diagnostic sera. Hence the person would be grouped as AB, whereas he might belong to groups O, A or B. Either washing the cells or heating to 40° C. would abolish the non-specific agglutination.

SUMMARY

A case of autohæmagglutination is described in a healthy man aged 27. When his blood is withdrawn into citrate or oxalate the red cells are agglutinated by his own serum at room or cold-room temperature, but not at 37° C. The reaction is reversible, for the clumps break up and disappear on warming to body temperature, to reappear on cooling.

Agglutination does not occur when the serum is mixed with cells which have been washed in normal saline, unless the cells are re-suspended in citrate or oxalate, or a trace of citrated or oxalated plasma is added. Normal group O cells are similarly agglutinated by the patient's serum in the presence of citrate.

Since heparinised plasma will not produce the reaction it is suggested that an important factor is the presence of citrate or oxalate. The addition of calcium chloride will inhibit the reaction, and it therefore appears that agglutination only occurs in the absence of ionised calcium.

The patient's washed red cells are not agglutinated by normal serum even in the presence of citrate.

The abnormality in this case appears to be an agglutinin in his serum which is active against red cells at room or cold-room temperature, but is inhibited by warming to 37° C. or by the presence of ionised calcium.

Autohæmagglutination of this type may lead to errors in blood-grouping unless the cells are washed in saline or the tests are carried out at body temperature.

REFERENCES

Boxwell, W. and Bigger, J. W. (1931) *J. Path. Bact.* **34**, 407.
Dockeray, G. C. and Sachs, H. (1941) *Ibid*, **52**, 203.
Gray, I., Greenfield, I. and Lederer, M. (1940), *J. Amer. med. Ass.* **114**, 1325.
Greenwald, H. M. (1938) *Amer. J. med. Sci.* **196**, 179.
McCombs, R. P. and McElroy, J. S. (1937) *Arch. intern. Med.* **59**, 107.
Robertson, O. H. and Rous, P. (1918) *J. exper. Med.* **27**, 563.
Rous, P. and Robertson, O. H. (1918) *Ibid*, p. 509.
Wiener, A. S. (1939) Blood Groups and Blood Transfusion, London.

RAYNAUD'S SYNDROME WITH SPONTANEOUS COLD HÆMAGGLUTINATION

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IT is generally thought that Raynaud's syndrome is brought about by angiospasm. In the following two cases a cold-agglutination phenomenon may be an additional causative factor.

CASE 1

A widow, aged 52, employed for past nine years as a cook doing her own washing up, admitted to North Middlesex County Hospital Feb. 29, 1940, under Dr. R. Kempthorne, whose clinical notes appear below. For two years she had complained of attacks of numbness and blueness of hands, feet, nose and ears on exposure to cold; first attack in cold weather of winter 1937–38. No previous history of "dead" fingers, and nothing similar in her family, including 3 healthy children. No history of excessive bleeding, blood in urine, purpura or phlebitis.

Short, stout woman, with healthy colour when warm; apparently in good health. Heart normal; no sign of arteriosclerosis; good pulsation in limb vessels. No scleroderma, œdema or other skin change. No enlarged glands. Abdomen obese, but no viscera felt. No changes in central nervous system. Urine normal. Wassermann reaction negative. On exposure out of doors for ten minutes at 3° C. fingers and distal part of hands, bulb of nose, and pinnæ became cyanosed; indoors at 16° C. nose and ears recovered in ten minutes and hands in thirty minutes. Maximal changes were obtained in hands by immersion to mid-forearm in water at 4° C. for six minutes. Thumbs, fingers and distal third of back of hands became discoloured, sometimes with complete cyanosis. Dead whiteness of distal halves of fingers, with patchy cyanosis near margins of whiteness, obtained by immersion for ten minutes at 10° C. Immersion of feet for five minutes at 4° C. produced cyanosis of toes, and dorsum of feet for about ½ in. proximal to webs of toes.

Red cells 3,600,000 per c.mm.; hæmoglobin 50%; colour-index 0·7; white cells 10,000 per c.mm. (polymorphs 63%, eosinophils 4%, lymphocytes 25%, monocytes 8%). Red cells showed well-marked anisocytosis, including some macrocytes, and diffuse polychromasia; occasional normoblasts. Platelets abundant. Fragility of red cells somewhat increased: lysis in 0·55% saline at 37° C. Sedimentation-rate (Westergren), at winter room temperature, 120 mm. in 30 min.; blood settled in large agglutinated granules. At 37° C. sedimentation-rate 12 mm. in 1 hour. Corpuscles belong to group B, she should therefore normally have only anti-A agglutinins in serum. Blood first examined during extremely cold weather, and it was noted that when put on a cold slide it immediately formed a mass of granules. Cell-count done by taking 1 c.cm. of blood from a vein and immediately mixing it into 99 c.cm. of slightly warmed saline; count then made before agglutination occurred. Donath-Landsteiner test negative. Blood-serum destitute of complement when tested against sensitised sheep's cells.

Characteristics of cold agglutinin.—In the irregular clumps formed in the cold, rouleaux formation, if it occurred, could not be identified. Both the serum and plasma, whether heparinised, citrated or oxalated, had the power of agglutinating both washed homologous red cells and the red cells of all groups, including O, in high titres; up to 1/1000 dilution for A and O. The cells dispersed again when the temperature was raised to 27° C. and re-agglutinated on cooling. Group A corpuscles, when agglutinated in the cold, only partially dispersed on warming, presumably because part of the agglutination was due to cold agglutinin and part to the specific anti-A agglutinin. In serum heated to 55° C. for thirty min. the cold-agglutinating power for O corpuscles was diminished, and heating to 58° C. for 30 min. destroyed it entirely. Group A corpuscles were still agglutinated by the heated serum.

After the power to agglutinate group O corpuscles was destroyed by heating the serum to 58° C. the function was not restored again by the addition of an equal volume of unheated serum from another person. The action of the cold agglutinin was prevented by Congo Red in total concentration of the dye in the mixture of 1/200. Normal red-cell agglutination is not affected by this dye even in strong concentrations, but Congo Red has the property of inhibiting phagocytosis, lysis and coagulation, which properties also depend on a heat-labile factor. These latter factors in the blood are, of course, susceptible to much smaller amounts of dye.

Absorption of the cold agglutinin with a thick suspension of O cells at 0° C. was only partially effective. Some lysis of the O cells had occurred. A suspension of yeast cells was ineffective as an absorbent. The agglutinin was not removed by shaking the serum for 5 min. with a third of its bulk of powdered animal charcoal.

The rapidity of agglutination and dispersal with varying temperature is well seen when a mixture of red cells (group O) and the serum is run through a fine capillary lying in a shallow bath on the microscope stage. The formation of large clumps rolling along the tube as soon as cold is applied and their immediate dissolution when warmed is very striking.

CASE 2

Married woman, aged 65, admitted May 3, 1940, to Addenbrooke's Hospital, Cambridge, under Prof. J. A. Ryle. In usual good health until 1937 when, after panhysterectomy for fibroids, began to feel tired. Noted that complexion was becoming yellow, and from November, 1939, that her fingers were cold, numb and tingling, and that they and her toes became very blue on exposure to cold. Small scar on tip of one finger where piece of flesh had become blue and sloughed off. During these two years had been unsuccessfully treated for anæmia, with liver and iron. Menstrual history not unusual. Bled profusely when only child was born; for this reason had no more children. Never had phlebitis. No family history of jaundice: two brothers, over 45, healthy. Only child, a girl, healthy. Lives in a cold house. Does not smoke or take alcohol. Appetite poor. No history of red or dark-coloured urine.

Thin woman who looks younger than her age. Skin loose and wrinkled with definite icteric tinge. Fundi normal. Wears dentures and has smooth, moist, red tongue. Chest

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normal. Through thin, lax abdominal wall edge of spleen can be felt at costal margin. At ends of digits there is an extremely soft putty-like pulp, over which are bluish spots, and small dry sloughing patches with definite lines of demarcation. Immersion in water to 10° C. makes fingers turn first blue and then white and starts tingling. On warming they turn bright red. Peripheral pulsations everywhere good. Blood-pressure in right brachial artery 112/80 mm. Hg; same elsewhere.

Urine normal; no blood or staining. Blood-films had to be made on warmed slides, or the cells clumped before spreading. Examination by Dr. A. M. Barrett showed neutrophils 38·5%, eosinophils 8%, basophils 1%, small lymphocytes 39%, large lymphocytes 13·5%. Platelets appear in usual numbers. Red cells show slight anisocytosis and slight poikilocytosis. Few small mis-shapen red cells present. Mean diameter of red cells 7·4 μ for 50 cells. Hæmoglobin 52%. Red and white cell counts not made because of difficulty in preventing clumping, even after dilution with saline or using anticoagulants. Fragility tests performed by Dr. Barrett's method and carried out at body temperature showed no abnormality. Bleeding-time, 1¼ min. Clotting-time 3¼ min. (Wright's method). Wassermann reaction negative.

Hæmagglutination tests were performed by Dr. Taylor and his staff at the Galton laboratory. The titre of the agglutinins was 1/4000 for the homologous red cells. Heating the serum to 55° C. for 25 min. did not destroy the agglutinins.

HÆMAGGLUTINATION TESTS

Cells	Readings at 4° C. and at room temperature				Readings at 37° C.			
	Serum			Saline	Serum			Saline
	a	b	Case 2		a	b	Case 2	
O	–	–	C	–	–	–	–	–
A	–	C	C	–	–	C	C	–
B	C	–	C	–	C	–	C	–
Case 2	C	C	C	C	–	–	–	–

C indicates clumping, – indicates no clumping.

From the table it can be seen that the patient's blood is group O. An agglutinin is present in her serum which clumps cells of all groups in the cold. Her cells likewise clump with all sera (including her own) in the cold. It would be necessary in grouping this patient's blood for transfusion to perform the tests at 37° C. Otherwise the cold agglutinin effective at room temperature would produce an apparent clumping in the cross-agglutination test. The red cells clump themselves in saline in the colder room. (It was also found that six prolonged washings of the cells failed to prevent this.) It was further noted that the agglutination which occurs in the cold was reversible when warmed.

Apart from the similar vascular changes and the presence of a powerful cold agglutinin in both cases there are other points of similarity in these two cases and some differences. Both are married women over 50 following domestic occupations. They were in good health until about two years before seeking advice, which they did during or soon after the very cold winter of 1939–40 on account of numbness and tingling of the hands. Both showed a moderate secondary anæmia and a definite eosinophilia. On the other hand they were physically quite dissimilar, one plump and fresh looking and the other wasted and icteric (the former seen some 12 months later however was definitely jaundiced and gave a positive indirect van den Bergh of 1·5 mg. per 100 c.cm.). Their differential white counts were widely different and their blood-groups were different.

DISCUSSION

Raynaud's syndrome is characterised by paroxysmal, intermittent colour changes of the extremities, precipitated by cold, and without clinical evidence of blockage of the large peripheral vessels. The theory of ætiology commonly brought forward is that of Lewis who postulates an inherent abnormality of the digital arteries rendering them unusually sensitive to cold. The fault, according to his demonstrations, seemed to be within the vessel wall rather than in the nerve-supply thereto. In the two cases described here the blood also shows the phenomenon of cold-autohæmagglutination. We think that so unusual a combination suggests a possible causal relationship. Witts (1936) has pointed out that in paroxysmal hæmoglobinuria e frigore, the syphilitic disease in which the well-known Donath-Landsteiner cold-sensitised hæmolysin is present, Raynaud's syndrome sometimes occurs with considerable severity. Autohæmagglutination is also known to be associated with anæmias and dysfunction of the liver (Boxwell and Bigger 1931) but latter are not hypersensitive states; it may also appear in otherwise normal persons. It is, however, generally recognised that people with one form of hypersensitivity often show others as well, and it seems probable that in our cases cold hypersensitivity played a part in the production of both the agglutination and the Raynaud's syndrome; in the latter the arteriolar musculature would be the sensitive tissue.

McCombs and McElroy (1937) have reported a case and have suggested the term reversible autohæmagglutination. They have collected further cases from the literature making a total of 38. They quote the Japanese authors Iwai and Mei-Sai who had already demonstrated intracapillary clumping in vitro, and had suggested that this might play a part in the production of Raynaud's syndrome. McCombs and McElroy believe that plugging with agglutinated cells would explain all the vascular symptoms in their case, which showed some degree of peripheral arteriosclerosis. In our own two cases the spastic element was evidently playing a large part.

SUMMARY

In two middle-aged women Raynaud's phenomena were associated with powerful cold agglutinins in their sera.

It is suggested that there was a causal relationship between the two conditions. Probably cold hypersensitivity played a part in the production of both.

We are indebted to Mr. Ivor Lewis, medical superintendent of North Middlesex County Hospital, for permission to publish case 1, and to Professor Ryle for permission to publish case 2.

REFERENCES

Boxwell, W. and Bigger, J. W. (1931) *J. Path. Bact.* **34**, 407.
Dockeray, G. C. and Sachs, H. (1941) *Ibid.*, **52**, 203.
McCombs, R. P. and McElroy, J. S. (1937) *Arch. intern. Med.* **59/1**, 107.
Witts, L. J. (1936) *Lancet*, **2**, 115.

GLANDULAR FEVER WITH JAUNDICE

REPORT ON TWO CASES

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THERE are few recorded cases of jaundice as a complication of glandular fever and little mention of it in most modern textbooks, though brief allusions are made by Tidy (1937) and Whitby and Britton (1937). In the first of the following two cases jaundice and fever were presenting symptoms before there was notable glandular enlargement, while in the second case transient jaundice appeared in the course of an otherwise characteristic attack.

CASE 1.—A soldier, aged 21, was admitted to an E.M.S. hospital on May 7, 1941, having been in a field ambulance since April 30 with headache, sore throat and pyrexia up to 103° F. No improvement had followed sulphapyridine (? 1 g.) 4-hourly for 48 hours and subsequent sulphanilamide (? 1 g.) 4-hourly for 4 days. Slight jaundice was noted on May 5 which was deeper on May 6 when splenic enlargement was found.

On May 7 he had slight jaundice of the skin and conjunctivæ, no rash was present or had been noted previously. Temperature 99·4° F., pulse-rate 90. Mouth and tongue dry and glazed, sordes on lips, but no ulceration or exudate on tonsils or fauces. No abdominal pain or tenderness, liver not enlarged, Traube's space dull to percussion but spleen not definitely felt. A few lymph-glands palpable, but not tender or strikingly enlarged, in the left supraclavicular fossa, axillæ and groins. Urine contained much bile, but no albumin or blood. Van den Bergh reaction: delayed direct. Throat swab on May 7: a few colonies of hæmolytic streptococci. Hæmatological and serological findings are shown in table I.

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Glandular enlargement increased until May 14, when the epitrochlear, cervical, supraclavicular, axillary and inguinal glands were notably enlarged and the spleen readily palpable. Jaundice deepened until May 12, then faded, and had gone by May 16 (total duration 10 days). Excess urobilin was present in the urine on May 17 but absent on May 23. The temperature was normal after May 19 and recovery uneventful. The man was very well on June 14 before rejoining his unit; only a few shotty glands were felt, Traube's space was partially resonant and the spleen impalpable, Paul-Bunnell reaction negative and white cells 5450 per c.mm. Table I shows the hæmatological and serological changes.

TABLE I—FINDINGS IN CASE 1

—	May					June 14
	9 & 10	14	16 & 17	20	31	
White cells per c.mm. ..	8800	12,500	18,100	10,100	5200	5450
Polymorphs (all forms) %	20	14	10	12·5	15·5	27
Lymphocytes % ..	56·5	55·5	44	66	80	66·5
Definite "glandular fever" cells % ..	22·5	30·5	45·5	19·5	3·5	4
Monocytes %	1	0	0·5	2	1	2·5
Paul-Bunnell reaction ..	Pos. 1/640	..	Pos. 1/640	..	..	Neg. 1/40

CASE 2.—A soldier, aged 22, was admitted to an E.M.S. hospital on June 6 complaining of malaise and shivering, painful throat and a lump in the left side of his neck of about 36 hours' duration. Temperature 102·6° F., pulse-rate 110, flushed but not looking or feeling very ill. Enlarged tender glands in both sides of neck, supraclavicular fossæ and left groin. Spleen and liver not felt. No rash. Tonsils large and fleshy, but not obviously infected, no ulceration or exudate on fauces but a throat swab on June 9 showed a heavy growth of hæmolytic streptococci. Hæmatological and serological changes are shown in table II. By June 13 the spleen was definitely palpable, epitrochlear glands on both sides were enlarged, and more enlarged glands had appeared in the axillæ and neck. The temperature, having swung daily between 99° and 102° or 103° F., fell abruptly to normal on May 15, when bile appeared in the urine and slight jaundice was noted in the skin and conjunctivæ. Serum from blood taken on the previous day for the Paul-Bunnell test was found to give a quantitative van den Bergh reaction of 3·5 units (normal range up to 1 unit).

On June 16 skin jaundice was barely visible but the urine still contained a trace of bile. On June 17 the skin was clear and no excess of urobilin could be shown in the urine. The total duration of jaundice was thus about 48 hours. By June 21 the patient was feeling well, and he was discharged a week later.

TABLE II—FINDINGS IN CASE 2

June ..	9	13 & 14	19 & 21	27 & 28
White cells per c.mm. ..	3900	13,750	6450	5000
Polymorphs (all forms) % ..	33	11·5	12	27
Lymphocytes %	44·5	54·5	68·5	66·5
Definite "glandular fever" cells %	20	32	17·5	2
Monocytes %	2·5	2	2	4·5
Paul-Bunnell reaction ..	Neg. 1/20	? Pos. 1/80	Pos. 1/160	? Pos. 1/80

The sheep cell agglutination test used for both cases was that of Stuart and others (1934), who modified the original Paul-Bunnell technique. In both cases the heterophile antibody was absorbed by ox-cells and not by guineapig kidney, thus fulfilling the criteria for glandular fever antibody as finally laid down by Davidsohn (1937). The strongly positive Paul-Bunnell reaction in case 1 after sulphonamide therapy is interesting in view of the suggestion (*Lancet*, 1941, 1, 84) that the sulphonamide drugs might suppress antibody formation, although Logan (1941) mentioned a case in which heavy sulphapyridine therapy did not have this effect. In case 2 the Paul-Bunnell titre was low despite the fact that no sulphonamide drugs had been given at all.

Frequent red cells of the "target" type were seen in blood films from both cases during their periods of jaundice; these cells were described in obstructive jaundice by Barrett (1938).

DISCUSSION

I have found 13 cases of glandular fever with jaundice in the literature (Downey and McKinlay 1923, Mackey and Wakefield 1925, Stuart et al. 1934, McKinlay 1935, de Vries 1938, Svaar-Seljesaeter 1939, Fowler and Tidrick 1940). Cathala and others (1939) recorded an alleged case, but the clinical and pathological data were not entirely convincing. Tidy (1934), in the Lumleian lectures, said that jaundice was a rare complication of glandular fever, especially in childhood, and that it commonly developed after the glandular enlargement, although it might occur before in the febrile type. de Vries (1938) recognised 3 types of jaundice in glandular fever: (1) a "forme ictérique à début ganglionnaire" where glandular enlargement was prominent, and jaundice developed during the course of the disease; (2) a "forme à début ictérique" where jaundice was the first symptom and the other features of glandular fever followed; and (3) very rare cases in which jaundice and slight pyrexia were the only symptoms, and the diagnosis of glandular fever rested on hæmatological findings and a positive Paul-Bunnell reaction. The first case recorded here appears to be an example of the febrile type of disease "à début ictérique," and the second of "forme ictérique à début ganglionnaire."

In the recorded cases the jaundice seldom lasted longer than a week, and was usually considered to be of obstructive origin rather than due to liver-damage or infection of the biliary passages. Few laboratory details were given, but frequent mention of pale stools and dark urine containing bile-pigments, with normal liver-function tests in several cases, supported the general opinion. The cause of biliary obstruction was assumed to be pressure from enlarged glands in the liver hilum, by analogy with the mesenteric glands which can be enlarged or palpable and cause abdominal pain. The liver is enlarged as a rule whether jaundice is present or not.

The main interest of jaundice in glandular fever lies in the diagnostic difficulties raised when it occurs before glandular enlargement is prominent and glandular fever suspected. Catarrhal jaundice and cholecystitis are mentioned as diagnostic pitfalls, as well as the pre-eruptive stage of syphilis, because the Wassermann reaction is often positive in glandular fever and thus may be associated with enlarged glands and a subsequent rash. de Vries (1938) even advocated examination of a blood film and a Paul-Bunnell test in every case of jaundice, and these investigations are certainly desirable in cases, such as case 1, which present unusual clinical features. In this case suspicion was aroused because the patient was not very ill despite a high temperature, and the lack of pain and tenderness excluded an acute gall-bladder lesion, while the absence of nausea, the high temperature and raised pulse-rate were against catarrhal jaundice—yet the deeply bile-stained urine indicated an obstructive jaundice. This last feature, coupled with the few palpable glands, the enlarging spleen and recent history of sore throat, suggested the true diagnosis.

SUMMARY

In 2 cases jaundice was associated with glandular fever. In one case jaundice was prominent and preceded the usual glandular enlargement, while in the other it occurred as a transient feature during the course of an otherwise typical attack of glandular fever. Hæmatological findings and positive Paul-Bunnell reactions confirmed the diagnosis in both cases.

The jaundice is of obstructive type and probably arises from enlargement of glands in the liver hilum.

Examination of a blood film and a Paul-Bunnell test are desirable in cases of obstructive jaundice of obscure causation.

My thanks are due to Dr. A. M. Barrett of the pathological department of Cambridge University for his help with the blood examinations and Paul-Bunnell tests, and to Dr. N. R. Lawrie, biochemist at Addenbrooke's Hospital, Cambridge, for the biochemical tests.

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TETANY FOLLOWING PROLONGED LACTATION ON A DEFICIENT DIET

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A WOMAN of 42 was first seen by one of us on April 23, 1941, as an outpatient. She gave a history of recurrent attacks of painful muscle spasm, the first experienced during the night two months previously, and affecting the forearms and hands. A week elapsed between this and the second attack in which trunk and limbs were involved. The description of the posture produced by the attack left no doubt that the spasms were typical of tetany of unusual severity. Major attacks occurred with increasing severity and frequency, and were accompanied by great pain. In the later weeks of the illness they were of almost nightly occurrence, varying in duration from a few minutes to two hours. At the end of an attack, the disappearance of spasm preceded by as much as an hour the disappearance of all discomfort. Minor symptoms occurred frequently by day as well as by night, and consisted of paræsthesiæ in the extremities and a feeling of stiffness in the muscles of the limbs. Even in the major attacks the higher centres were unaffected. Amenorrhœa had been present ever since the last pregnancy until three weeks before admission when uterine bleeding began.

She gave a vague history of painful spasms of the hands and feet in childhood, rather similar to the attacks described above. After a year's disability the condition subsided, and until the present illness she had been in excellent health. She had had 7 children, of whom 1 died at the age of 9 months from bronchopneumonia; the others were alive and well. All were normal spontaneous deliveries. The first 6 were breast fed for 9 months, but the youngest child at the age of 21 months was still at the breast when the patient was seen by us. Questioned about her diet, she said that for breakfast she always took porridge without milk, with an egg once a week. Her midday meal consisted mainly of potatoes with occasionally mince or other form of meat. A milk pudding was sometimes taken, but she was quite definite that in the week she did not have more than ½ pint milk, except for the small amount of condensed milk she had in her tea. Other meals consisted chiefly of bread and tea.

The patient was a poorly nourished sallow rachitic female of short stature. Though mentally very listless, she presented to an extreme degree the many clinical signs of undue muscle irritability associated with tetany. Chvostek's sign was readily elicited, and Trousseau's was uniformly positive within 1–2 minutes of compression of the upper arm. Though the peripheral nerves and muscles were hyperexcitable to percussion, the tendon reflexes were all sluggish and the abdominal reflexes, during her stay in hospital, could not be elicited. The results of general examination of the patient were in great part negative, though the vaginal bleeding still continued. B.P. 100/60. Red cells 3,300,000; white cells 6400; Hb. 9·6 g.%. The breasts still contained milk.

While under observation, and before treatment was begun, she had occasional discomfort and paræsthesia in the extremities. Slight localised, but no generalised, tonic spasm occurred spontaneously during these few days. The most prominent complaint was pain in the lower lumbar region.

Radiological findings (Dr. R. K. Harper).—"There are no changes in the skull or pelvis. There is thinning of the cortex of the femora and tibiæ with uniform decalcification of the extremities of the long bones. Slight decalcification of the fibulæ and bones of the forearms is also seen. There is slight bowing of the left tibia which may be due to these changes although the bowing may be old as there is probably insufficient decalcification to account for the recent bowing."

Clinical progress.—The patient was admitted to Dr. David Smith's wards on April 29, 1941, and subsequently transferred on May 3 to the metabolic wards for investigation. Lactation was stopped on admission. Treatment was begun eight days later and consisted solely of a mixed diet of 2700 calories, including 1½ pints of milk daily. The result was complete relief from muscle spasm and subjective sensory disturbances. By May 15 there was no evidence of muscle irritability. The vaginal bleeding was much diminished and by the 20th had ceased entirely. She was discharged on May 30, and a month later was seen as an outpatient. She was then still rather pale, but her listlessness had gone; there was neither subjective nor objective evidence of tetany. She was sent to a convalescent home where she received extra milk. A scale preparation of iron was prescribed for the anæmia.

Biochemical investigation.—April 30 and May 6, serum calcium 6·9 mg. per 100 c.cm. May 7, treatment begun. May 13, serum calcium 9·4 mg., plasma inorganic phosphorus 2·7 mg. per 100 c.cm. May 25, serum calcium 10·2 mg. May 30, discharged. June 20, serum calcium 9·0 mg. per 100 c.cm.

Calcium balance.—Three-day period beginning May 20. Calcium in urine was estimated by the method of Shohl and Pedley (1922), in food and fæces by that of McCrudden (1909–10, 1911–12).

Daily output—Urine	0·075 g.	*Daily intake*	1·204 g.
Fæces	0·694 g.	*Balance*	+ 0·435 g.
Total	0·769 g.	*Per cent. retention*	27

Too great stress cannot be placed on the calcium balance taken for one period of three days. But it is obvious that a very considerable retention of calcium was taking place.

COMMENT

This case of early "osteomalacia" with tetany presents several interesting features. The poor diet deficient in calcium combined with the drain of repeated pregnancies and prolonged lactation was sufficient to produce definite clinical, radiological and chemical evidence of gross calcium deficiency. Our impression is that such a deficient diet is common in the poorer classes of Glasgow, in spite of contrary statements that have been made. To elicit a true account of the average diet requires careful inquiry; only detailed questions as to the actual food eaten day by day will determine the true intake. Our patient is a case in point; when first questioned the impression was gained that her diet was adequate and its unsatisfactory nature was discovered only after detailed questioning. The rapid recovery from tetany and hypocalcæmia under treatment with a high-calcium milk diet assisted by weaning is in striking contrast to the lack of response in tetany due to non-absorption of calcium such as that found in non-tropical sprue, and is comparable to the rapid absorption of calcium in hunger osteopathy reported by Crawford and Cuthbertson (1934).

As Mellanby (1933) says, "It is probable that many women suffer some osteoporotic change owing to pregnancy." While this is an extreme case in which the calcium deficiency was brought to light by the occurrence of tetany, there is no doubt that it is an example, unusual only in degree, of general calcium deficiency in lactating women living under similar conditions.

We are much indebted to Dr. David Smith for the opportunity to investigate this case.

REFERENCES

Crawford, A. M. and Cuthbertson, D. P. (1934) *Quart. J. Med.* **27**, 87.
McCrudden, F. H. (1909–10) *J. biol. Chem.* **7**, 83.
— (1911–12) *Ibid*, **10**, 187.
Mellanby, E. (1933) *Lancet*, **2**, 1131.
Shohl, A. T. and Pedley, F. G. (1922) *J. biol. Chem.* **50**, 537.

DR. MARTIN: REFERENCES

Barrett, A. M. (1938) *J. Path. Bact.* **46**, 603.
Cathala, J., Auzepy, P. and Séguin (1938) *Bull. Soc. méd. Hôp. Paris*, **18**, 831.
Davidsohn, I. (1937) *J. Amer. med. Ass.* **108**, 289
Downey, H. and McKinlay, C. A. (1923) *Arch. intern. Med.* **32**, 82.
Fowler, W. M. and Tidrick, R. T. (1940) *Amer. J. clin. Path.* **10**, 548.
Logan, R. F. L. (1941) *Lancet*, **1**, 648.
Mackey, R. D. and Wakefield, A. M. (1926) *Ann. clin. Med.* **4**, 727.
McKinlay, C. A. (1935) *J. Amer. med. Ass.* **105**, 761.
Stuart, C. A., Burgess, A. M., Lawson, H. A. and Wellmann, H. E. (1934) *Arch. intern. Med.* **54**, 199.
Svaar-Seljesaeter, O. (1939) *Nord. Med.* **4**, 3517.
Tidy, H. L. (1934) *Lancet*, **2**, 180,236.
— (1937) British Encyclopædia of Medical Practice, vol. IV, 572.
de Vries, S. I. (1938) *Acta. med. scand.* **95**, 552.
Whitby, L. E. H. and Britton, C. J. C. (1937) Disorders of the Blood, London, p. 456.

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WELL-LEG TRACTION APPARATUS FOR REDUCING FRACTURED FEMORAL NECK

E. MERVYN EVANS, M.B. CAMB., F.R.C.S.

ACTING SURGICAL AND ORTHOPÆDIC REGISTRAR AT THE MIDDLESEX HOSPITAL; SURGEON, E.M.S.

THE principle of well-leg traction may be applied with advantage to the reduction of fractures of the neck of the femur prior to their fixation by the insertion of a Smith-Petersen pin; by this method a rapid and atraumatic reduction is obtained in the patient's bed, whether in a hospital or at home, and X-ray confirmation is available before the operation is undertaken. When the reduction is satisfactory the patient may be moved in the apparatus without fear of disturbing the fracture. The method thus has several advantages over other methods commonly employed. Reduction by manipulation immediately before operation is satisfactory in most cases, but occasionally accurate reduction is not obtained even after several attempts, and, with the theatre and X-ray teams waiting to proceed, the surgeon may be tempted to accept an imperfect reduction. Reduction by weight extension in bed is relatively certain, but movement of the patient to the theatre is difficult and the fracture may be displaced during the process. Reduction on a Hawley table overcomes these difficulties, but the method is restricted to those institutions where the necessary equipment is available. With regard to the complete-bed technique many surgeons consider that the insertion of a Smith-Petersen pin is not a suitable operation to be performed in bed whatever the advantages of the method.

With these points in mind I have made a modification of the Roger-Anderson apparatus to be used with strapping extension. The speed with which the fracture is reduced allows of heavy extension (40–50 lb.) being used without fear of skin lesions.

The splint (fig. 1) consists essentially of a long metal stirrup which is incorporated in a thickly padded plaster extending from the foot to the mid-thigh on the sound side. The sides of the stirrup are prolonged below the foot and bent inwards so that they run together to a point 18 in. below the foot on the injured side. A pulley is fixed to the splint at this point, and over this screw-traction is applied to the injured limb; a spring balance is interposed between the screw and the strapping extension to measure the amount of traction. I have found it convenient to incorporate a cradle attached to the sound limb, from which the injured limb may be suspended. Internal rotation of the injured limb is obtained by attaching a broad strip of adhesive strapping to the outer side of the limb and fixing it to the overhanging cradle.

With this splint a fracture of the neck of the femur is reduced very quickly, and with the minimum of disturbance to the patient. The splint is applied in bed without an anæsthetic, though a sedative will be found of advantage. It is best to apply heavy traction (up to 40–50 lb.) at first, reducing this to 20–30 lb. as soon as the greater trochanter has come down to its normal level. Anteroposterior and lateral radiograms are taken, and if reduction is satisfactory the patient is transported to the theatre at leisure. If reduction is incomplete traction is continued until the desired result is obtained. The operation is performed with the splint in position and the extension on, but as soon as the pin has been inserted the extension is removed so that the fracture may be impacted; after this the apparatus is removed.

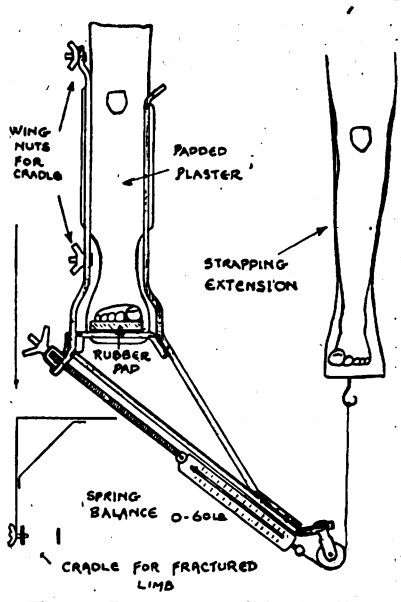

FIG. 1—Diagram of well-leg traction apparatus.

I have treated three cases by this method and in all reduction was obtained within 12 hours. The principle of heavy fixed traction is the same as that employed on a Hawley table, and reduction must be very rapid. I am satisfied that if it had been convenient to X ray these cases earlier the same result would have been obtained.

The fixation of the sound limb necessitates the use of a different technique from that usually employed for the lateral radiogram. A cassette is thrust as high up into the perineum as possible so that it faces upwards towards the injured side, and the X-ray tube is directed downwards from the loin on the injured side at a distance of 36 in. from the cassette. The tilting of the pelvis downwards on the injured side, owing to the pull of the screw-traction, makes a good lateral view of the head and neck of the femur possible. Fig. 2 illustrates a case treated by this method.

SUMMARY

A method of reducing fractures of the neck of the femur by well-leg traction in a modified Roger-Anderson apparatus is described. It ensures a rapid and atraumatic reduction, obtained in the patient's bed and confirmed by X ray before operation. The fracture can be immobilised and the patient transferred to the theatre without fear of redisplacement, and the fixation is maintained until the insertion of a Smith-Petersen pin has been completed.

I am indebted to Mr. A. S. Blundell Bankart for his help and advice, and to Major Eric Samuel for the development of the X-ray technique. The instrument has been made for me by Messrs. Down Bros.

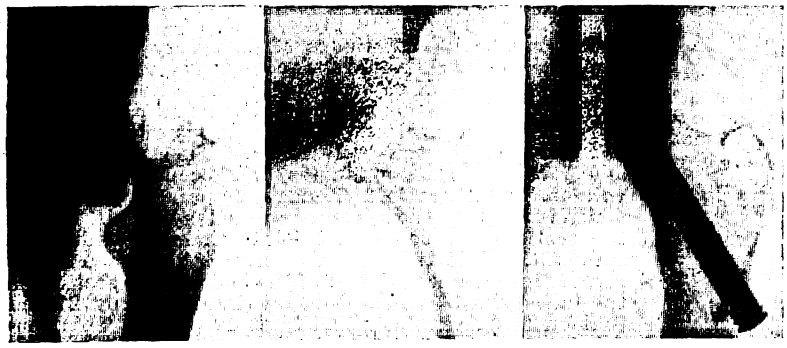

FIG. 2—Fractured neck of femur. (*a*) Before reduction. (*b*) After reduction in well-leg traction apparatus. (*c*) After insertion of Smith-Petersen pin.

"... There are some things worth waiting for even in war, and high among these is the maturity which comes to boys of ability and character after even a brief experience of University life and work. ... I have found the most convinced and outspoken believers in the value of this academic process even for the purposes of war among the representatives of the Fighting Services. I could wish that this fact were better known in the schools, where the natural but mistaken feeling still lingers that a University education, however compressed and accompanied by Service training, is in these days a privilege which the highspirited should perhaps forgo."—G. S. GORDON, vice-chancellor of the University of Oxford, in his valedictory oration to convocation on Oct. 8.

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A CASE OF PRIMARY OVARIAN PREGNANCY

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Pathological findings by T. N. GLEDHILL, B.A. OXFD, M.R.C.S.; PATHOLOGIST-IN-CHARGE, E.M.S. LABORATORY

THE case published in 1899 by Catherine van Tussenbrock[1] of Amsterdam proved that primary ovarian pregnancy was a definite entity. Though it is still regarded as rare a number of cases have since been reported, in recent years particularly in America and Germany. The usual course is early rupture of the ovary with only moderate bleeding and the exact diagnosis has as a rule been obscure until operation, though in a few cases the pregnancy goes on to full term and in some gives rise to lithopædion formations. In the case here recorded hæmorrhage was extremely severe, the diagnosis of a ruptured ectopic gestation was made with certainty before operation, and there was the added complication of a ruptured corpus luteum hæmatoma.

A married woman of 26 was sent by Dr. H. W. Bowen of Carshalton on June 10, 1941, to Sutton and Cheam General Hospital as a surgical emergency. During 11 months of married life she had taken no contraceptive measures except very occasional douching. She had no child, but in January had probably had a very early abortion. No history of previous illnesses or operations. Menstruation started at 14 years and was of the 28 day type; it lasted 6 days and was always relatively painless. Last menstrual period was stated to have been exactly 4 weeks before admission. She had had acute symptoms for 11½ hours prior to admission.

She was obviously suffering from a very severe internal hæmorrhage and was in extremis. A diagnosis of a ruptured ectopic gestation was made though this was expected to be tubal and not ovarian. Arrangements were made for immediate laparotomy combined with continuous blood-transfusion both during the operation and afterwards. Gas-oxygen-ether anæsthesia was administered by Dr. J. H. Willis, and Dr. A. C. Anderson gave the drip transfusion. The peritoneal cavity was almost completely full of blood and recent blood-clot. The actual amount of blood lost can roughly be estimated by the fact that 18 hours after operation, though she had had 3 pints of blood transfused, the red cells numbered only 2,940,000 per c.mm.; hæmoglobin 56%. When the blood and blood-clot had been mopped out as thoroughly and quickly as possible it was seen that fairly brisk hæmorrhage was still coming from a rupture in the right ovary. This immediately ceased on applying pressure to the ovarian artery and so the vessel was tied and the ovary removed without difficulty. The right fallopian tube was found to be normal and unattached to the ovary; it was therefore left alone. The left tube and ovary were normal and the uterus was slightly enlarged. The patient returned home on July 3 and is now well. She had a menstrual period 28 days after operation and has been regular ever since.

Pathological report.—The ovary is somewhat enlarged and shows rupture of its surface at two places: on the superior border near the upper pole, and on the posterior surface near the lower pole. Recent blood-clot is present around each site of rupture. On section it is clear that the hæmorrhage emanated from two ruptured "cysts" each filled with blood-clot. The upper "cyst" is 1 cm. in diameter and the lower 1·5 cm. in diameter. The latter is surrounded by a narrow yellow zone. There is no connexion between the cysts. Microscopically the lower cyst has the structure of a corpus luteum hæmatoma. The upper shows, among the recent blood-clot, several chorionic villi, mainly near the site of rupture; and scattered small masses of what appear to be decidual cells. This is a ruptured primary ovarian pregnancy associated with a ruptured corpus luteum hæmatoma.

Clinically this appeared to be a possible case of primary ovarian pregnancy, though a ruptured Graafian follicle with intra-abdominal hæmorrhage could not be excluded without microscopical examination. From a pathological standpoint the literature indicates that to clench the diagnosis chorionic villi must be present, and some experts, though not by any means all, also demand the finding of decidual cells but none think the finding of an embryo to be essential, though occasionally it has been isolated from either the blood or the blood-clot effused.

1. *Ann. Gynéc. Obstét.* 1899, 52, 537.

Reviews of Books

Medicine versus Invasion

Home Guard Medical Service in Action. G. B. SHIRLAW, L.R.C.P.E., assistant medical officer A.R.P. for Battersea; and CLIFFORD TROKE, staff officer, Finsbury casualty services. London: Secker and Warburg. Pp. 228. 7*s.* 6*d.*

READERS have already had a taste of the quality of this book (*Lancet*, Aug. 23, 1941, p. 225). It is not enough to say of it that all should buy and read it: it should be distributed to every Home Guard officer, fighting as well as medical. Most people must have thought or wondered just what will be the functions of the Home Guard, but speculation is here given a technical and professional starting-point which is sharply stimulating. The first-aid section is thoroughly sensible; it is adequate, has no redundancies, and is based on the definition "immediate temporary assistance." The first two sections of the book deal with casualty service tactics and military appreciations. The casualty service tactics include the principles of military medicine, the theory of invasion, medical strategy in modern warfare and the part to be played by the Home Guard in town and country. Military appreciations include a review of the terrain and descriptions of several hypothetical battles—the battles of Glebeshire, of Barchester, of the Bridgehead and of the Corridor. It is these chapters, deliberately drawing a rather dreadful picture of possibilities, which are so important; for unpalatable as the dose may be there is not a single ingredient of which we can say that it might have been left out, or that it has been added with an impossibly lavish hand. All that is described may happen, and to us. "The official view of invasion," say the authors, "is of necessity optimistic (and on the whole justly so), but it is impossible to avoid the suspicion that a nice, neat, comfortable sort of invasion had been pictured and provided for, while the reality will be nasty, untidy and acutely uncomfortable for all concerned."

Diseases of the Nervous System

(2nd ed.) F. M. R. WALSHE, M.D. Lond., F.R.C.P. Edinburgh: E. and S. Livingstone. Pp. 325. 12*s.* 6*d.*

AN elementary textbook which reaches a second edition within a year has already proved its value. Dr. Walshe aimed only at producing a simple textbook adapted to the needs of the student and the practitioner, and he was successful because he maintained a delicate balance between the fundamental needs of elementary teaching and the critical selection of material. The first edition contained scattered errors of emphasis and statement, of which many have been adjusted, and a number of its briefer sections have been amplified. Some clinical photographs and anatomical diagrams have been added, and there is more about the effects of infection and injury upon the central nervous system and peripheral nerves. The author's choice of words makes the book a pleasure to read.

Roentgen Interpretation

(6th ed.) G. W. HOLMES, M.D., and H. E. RUGGLES, M.D. London: Henry Kimpton. Pp. 364. 24*s.*

THE sixth edition of this popular book will be welcomed by British radiologists. Holmes and Ruggles in their first edition in 1919 did great service by stressing the need for a sound knowledge of pathology and general medicine as a background for accurate radiological interpretation. The X-ray diagnosis of bone and joint lesions occupied a large part of the early editions; in those days our knowledge of the radiology of the thoracic and abdominal viscera was scanty. The study of bones and joints still predominates and occupies half the volume, and there is a 30-page chapter on the spine which is ideal for the student of radiology and indeed all the sections on bones and joints maintain this high standard. Unfortunately too much has been compressed into the second half of the book. The section on the lungs gets 37 pages, that on the heart only 27 and that on the gastro-intestinal tract 44 pages. This condensation has led to some dogmatic and unproven statements and we should like the two distinguished American teachers to take more space another time to set out their own experience.

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THE LANCET

LONDON: SATURDAY, OCTOBER 25, 1941

LIGHTENING THE LOAD

In January national health insurance will be extended to half a million people with incomes up to £420, and whether or not doctors approve of the extension a number of them will find it brings an additional burden to what was already becoming a harassed life. The addition may not sound numerically large—in 1938 the 16,840,000 insured persons were shared on 16,200 doctors' lists—but there are now fewer doctors in panel practice and the newcomers will not be evenly distributed on the lists. Moreover they are drawn from the income group which have hitherto found the doctor's bill particularly hard to meet and have therefore stinted themselves of medical attendance even beyond the limits of safety. They will now come to the doctor for many ailments which they would previously have treated themselves or left untreated, and some of them, from ignorance of the rules and customs of insurance practice, may give the doctor more trouble than they need and not get as good attention as they might. The insured person, like his doctor, is bound by a code of rules; but, whereas the doctor who breaks his may well find his quarterly cheque reduced by way of fine, the patient's shortcomings are overlooked unless they affect his relations with the approved society. The seven rules which should govern his relations with the doctor are printed on the back of his medical card in type so inconspicuous that few patients read them even if their eyesight allows them to do so. The rules are sound, and if strictly kept would bring ease to the busy practitioner. "He shall," says rule *e*, "whenever his condition permits, attend at the surgery or place of residence of the practitioner attending him on such days and at such hours as may be appointed by the practitioner." "He shall not," says *f*, "summon the practitioner to visit him between the hours of 6 P.M. and 9 A.M. except in cases of serious emergency." "He shall," ends *g*, "when his condition requires a home visit, give notice to the practitioner, if the circumstances of the case permit, before 10 A.M. on the day in which the visit is required." On the whole insured patients are reasonably good about attending the surgery once they have found their way to it and overcome their initial shyness, but the new class of patient may not appreciate the charms of a chat in the waiting-room. Rules *f* and *g*, too, are more often broken by newcomers than by the old hands who have been well trained by the doctor and know his ways. The unnecessary messages at odd hours which lead to double journeys and make the day's visiting-list unending often arise from misapplied kindness of heart in the patient ("I left it as long as I could, Doctor"), though there is a playful East End habit in an emergency of broadcasting appeals to every doctor within reach, so that three have been known to meet on the doorstep. A nice judgment of what constitutes a "serious emergency" may require more levelheadedness and clinical acumen than the general run of patients or their relatives possess, and while the late evening call may appeal to the dramatic sense it is more likely to originate from panic or a faulty diagnosis than from reckless disregard of the doctor's convenience.

What are the remedies? For the very few who treat the doctor as they do all public servants and demand their rights with no thought for the servants' convenience the doctor can in theory seek redress from the insurance committee, but he rarely does. Nearly all will make as little trouble as they can if they are shown the doctor's point of view. The familiar methods of propaganda could here be effectively applied. The extension of insurance seems a fitting occasion for a "Help your Doctor to help You" campaign, the B.B.C. providing a series of five-minute conversations between doctor and patient, and the Ministry of Health supporting them with advertisements in the press. This might, in fact, be made part of the large "Health Front" advocated by Dr. BARBER on another page. The doctor should speak his mind on occasion and he can appeal to the patient's better nature by handbills or posters exhibited in his waiting-room, as suggested in these columns last year.[1]

IF YOU WANT TO HELP YOUR DOCTOR IN WAR-TIME

Send messages before 10 A.M. if you want him to visit you. Remember that his petrol is rationed and that his travelling expenses have risen, so he doesn't want to cover the ground twice or more on one day, especially during the blackout.

Avoid night calls and Sunday visits whenever possible. Come to the surgery if you can, rather than ask for a visit, and come during surgery hours, the earlier the better.

In a message state as clearly as you can what is wrong and how long the patient has been ill. Don't exaggerate or the doctor may have to neglect somebody more seriously ill in order to hurry to you.

Before the war the London insurance committee and some others enclosed in each new medical card a list of Don'ts—e.g., "Don't forget your medical card when you want the doctor." Shortage of paper has suspended this custom, but it might well be revived for the January freshmen, who will respond more heartily to the medical Do-this than to the administrative Don't-do-that. The universal consideration for the doctor which such a campaign might bring would do much this winter to offset the trials of blackout and blitz and the tribulations of a changing population and shorthandedness.

PROBLEMS IN HÆMAGGLUTINATION

Two aspects of agglutination phenomena in blood are receiving current attention; the first is the question of autoagglutination. Few experiences are more disturbing than to be asked to provide blood for the urgent transfusion of a gravely anæmic patient and to find that the patient's serum agglutinates the red cells of all available blood; the patient's serum tested against his own cells will be found to agglutinate these as well—hence the phenomenon is called "autoagglutination." It is due to the presence in the serum of a non-specific, cold-sensitive agglutinin; this affects red blood-cells of all blood groups and is most active below 5° C., still active at room temperature, but as a rule inactive at 37° C. The term "autoagglutination" is now applied only when the effect is seen at room temperature or above. Autoagglutination is often associated with severe anæmia and with disease of the liver. It has not been certainly shown to cause any disease but Mr. BENIANS

1. *Lancet*, 1940, 2, 409.

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and Captain FEASBY, who report in this issue the combination of Raynaud's syndrome and autoagglutination, regard them both as caused by chilling in a cold-sensitive patient. The blood of outwardly normal people may also show it; an example is provided on another page by Dr. PARISH and Dr. MACFARLANE'S report of an unusual case in which ionised calcium played a part, and it is noteworthy that, though their patient was an allergic subject with angioneurotic œdema, the autoagglutination was not connected with any allergic attacks. Autoagglutination is not common, but among the large numbers of people now being grouped by the transfusion services some are bound to show it, and since the ordinary grouping tests will not detect them the effects of possible misgrouping are worth examination.

When blood is taken for the grouping test sufficient plasma is carried over to agglutinate the red cells even in the presence of test sera; the autoagglutinator will therefore be recorded as group AB when in fact he might be any of the other groups. If his blood is taken for transfusing a group AB patient unexpected agglutination will take place when his cells are tested against the patient's serum. The next step is usually to try another specimen of blood, so that as long as cross-matching is possible no harm will be done, and in emergencies when time does not permit cross-matching group O blood—never group AB—is used. If the autoagglutinator's blood is turned into serum or plasma the results are again unlikely to be serious since the abnormal agglutinin is usually inactive at 37° C., and with the large batches of pooled plasma now used the abnormal agglutinin will be much diluted. The true group of an autoagglutinator can usually be determined by repeating the tests at 37° C. or by washing the red cells in saline before testing. If the incorrectly grouped autoagglutinator is himself to receive blood he will be safe so long as cross-matching is properly done, when unexpected agglutination should indicate the necessity for repeating the grouping test at 37° C. The drip method is undoubtedly the safest way of giving blood to such a patient. The mass-production tactics of the transfusion services make it difficult for every group AB donor to be regrouped using precautions to detect autoagglutinators, and such regrouping is not vital. On the other hand, when patients in need of transfusion for severe anæmia are found to be group AB, it is worth while to exclude autoagglutination.

The second problem, involving group-specific isoagglutinins, arises in connexion with the use of serum for transfusion. Just as the blood-banks store group O blood for emergency use because its red cells contain no agglutinogens, so from a theoretical standpoint group AB serum is the ideal since it contains no agglutinins. But only 3–7% of donors are group AB; much of the plasma and serum comes necessarily from the 40–46% of donors who are group O and therefore contains both anti-A and anti-B agglutinins. BRYCE and JAKOBOWICZ,[1] who made a quantitative examination of a large number of group O sera, found that 31·2% had an anti-A titre and 10·1% an anti-B titre of over 1 in 100. It is generally thought desirable that plasma or serum, especially concentrated serum, should be freed from these isoagglutinins, and the fact that it is more difficult for serum to be so freed has been made a point against its use. Mixing of group A and group B blood before separating the plasma, so that the A cells absorb the anti-A isoagglutinins of group B blood and vice versa, has been one method, but this again limits the donors to about 50% of those available. DELLA VIDA and DYKE[2] utilised the fact that agglutinogens are not limited to the red blood-cells but also occur in body fluids including plasma and serum, so that group A serum can be used to absorb the anti-A isoagglutinins of group B serum and vice versa. They showed how with group O serum the agglutinin titre could be considerably reduced, even if not completely absorbed, by mixing in suitable proportions with group A and B sera, so that the blood of all groups could be used. A third method is suggested by WITEBSKY, KLENDSHOJ and SWANSON.[3] They point out that the group-specific substances (agglutinogens) are complex carbohydrate-like bodies resembling the capsular substance of pneumococci. Group A substance can be prepared from commercial pepsin, mucin or peptone, but group B substance has so far only been isolated from the gastric juice of group B persons. By adding these two group-specific substances to group O blood they are able to reduce the titre of the anti-A and anti-B agglutinins in the plasma to a safe level. This method is an interesting application of our increasing knowlegdge of the nature of the blood groups but is hardly suitable as yet for large-scale work. Clinical reports of reactions after the transfusion of group O serum into patients of other groups are scanty, and it is not yet clear how far the presence of anti-A and anti-B isoagglutinins is really detrimental. The definition of safe limits for the titres of these agglutinins in pooled serum should not be too difficult and would provide the transfusion services with a useful standard.

1. Bryce, L. M. and Jakobowicz, R. *Med. J. Aust.* 1941, 1, 290.

PERTUSSIS PROPHYLAXIS

THE present prevalence of whooping-cough reminds us how little has been attempted in this country towards the prevention of this preventable disease. Too many of us still regard pertussis and measles as the inescapable and not very serious afflictions of childhood. But in London these two rank fourth and fifth among the causes of death in children under five years, and in hospital practice the case-fatality from pertussis exceeds that of both measles and diphtheria (L.C.C. Annual Report, 1935). Moreover, about a tenth of the cases and two-fifths of the deaths from pertussis occur in the first year of life[4] while STOCKS estimated that 44% of London children developed the disease before their fifth birthday. Prophylaxis of so prevalent a respiratory infection could only be possible by specific vaccination, and this method of prevention has been shown, particularly in America, to be a practical possibility. Unfortunately, four or five weekly injections of large doses (10–30 thousand million organisms) of a carefully prepared smooth-phase vaccine are apparently necessary to secure an effective immunity, which for large-scale immunisation introduces serious problems in production and administration. The possibility of protecting the child by fewer doses of the vaccine spaced at longer intervals, as has been proved effective with diphtheria

2. Della Vida, B. L. and Dyke, S. C. *Lancet*, 1941, 1, 564.
3. Witebsky, E., Klendshoj, N. C. and Swanson, P. *J. Amer. med. Ass.* 1941, 116, 2654.
4. Zamkin, H. O. *Amer. J. publ. Hlth*, 1940, 30, 394.

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toxoid, had not until recently been given a serious trial under controlled conditions. McLEAN [5] at a clinic at St. Mary's Hospital vaccinated 513 children over a period of 4 years, using three doses of 4000 million organisms at 3–7 day intervals followed by a fourth dose a month later, and he reported no cases of whooping-cough among 46 known and 45 suspected exposures, whereas in a control group of 154 children, 89 cases followed 115 exposures. SCHÜTZE [6] showed experimentally that the combination of diphtheria alum-precipitated toxoid and pertussis vaccine had no inhibitory action on the immunising property of either antigen, and the idea of combined immunisation against these two diseases has been gaining ground. A single dose of an alum-precipitated pertussis vaccine was given a clinical trial in Maryland, U.S.A., in 1936–37, and although the evidence of protection was not such as to justify recommendation of the "one-shot" vaccine there were no severe reactions.

A large-scale investigation in Norfolk, Virginia, was therefore planned to find if two doses of the alum-precipitated vaccine at a month's interval would give real protection against pertussis. The first report [7] on this investigation is largely concerned with the planning of the experiment so as to obtain (1) an injected group identical in all essentials with a control uninjected group, (2) the uniform observation of both groups over an adequate period of time, and (3) a definition of pertussis as a clinical entity which could be uniformly recognised. The difficulties encountered need not be enumerated; the manner in which they were tackled and largely overcome should be carefully studied by any team of workers likely to undertake similar field studies in this country. Two 1 c.cm. doses of an alum-precipitated vaccine containing 10,000 million organisms per c.cm. were injected subcutaneously in the deltoid region of first one arm and then the other at a month's interval. Very few children had any systemic reaction; there was some local tenderness and stiffness, but if the vaccine was not injected too superficially the firm nodule which usually developed was not noticed by the parents. After various discards there remained for analysis 641 vaccinated (V) and 571 non-vaccinated (N) children, and these were divided into two age-groups according as they were born (A) before and (B) after July 1, 1937. The table, taken from a larger table illustrating the comparative incidence of measles, chickenpox and mumps in the two groups, shows the incidence of pertussis in vaccinated and unvaccinated children before June 1, 1938, when vaccination was begun, and for 34 months after that date. The results are not very different from those obtained in their large-scale and carefully controlled experiment by KENDRICK and ELDERLING [8] who used a total of 70,000 million organisms given in four weekly doses, and reported an *annual* attack-rate of 2·3% in the inoculated and 15·1% in the controls. As usually happens, it was noted in the Virginia series that pertussis when it did occur in a vaccinated child was milder and of shorter duration than the attack in the uninoculated children. These results with alum-precipitated pertussis vaccine should encourage health authorities to combine the pertussis vaccine with diphtheria A.P.T., in which case it would seem advisable to start the double immunisation during the second six months of life, for at that age pertussis takes a heavy toll of infected children.

Age-group	Vacc. (V) for non-vacc. (N)	Pertussis before June 1, 1938			Pertussis in the 34 months after June 1, 1938		
		No. of children	No. of cases	Attacked (%)	No. of children	No. of cases	Attacked (%)
A	V	344	52	15·1	259	29	11·2
	N	304	45	14·8	230	90	39·1
	Total	648	97	15·0	489	119	24·3
B	V	297	17	5·7	234	22	9·4
	N	267	23	8·6	202	60	29·7
	Total	564	40	7·1	436	82	18·8

Passive protection against the infection by the use of human blood or serum has been claimed to be effective (MEADER).[9] Using the method of intranasal infection of mice, NORTH and others [10] found that the serum of child convalescents or of immunised children protected against large infecting doses, whereas pooled adult serum protected only irregularly against sublethal mouse infections. Fortunately pertussis has not the high infectivity of measles or chickenpox when it is introduced into a hospital ward, so that the need for passive protection is less urgent. But in the home any child under two years who has been exposed to infection might with advantage be given a protective dose of human serum. For this purpose panels of immunised donors could with a little organisation be made available.

5. McLean, I. H. *Proc. R. Soc. Med.* 1940, **33**, 425.
6. Schütze, H. *Lancet*, 1940, **2**, 192.
7. Bell, J. A. *Publ. Hlth Rep., Wash.* 1941, **56**, 1535.
8. Kendrick, P. and Elderling, G. *Amer. J. Hyg.* 1939, **29**, 133.
9. Meader, F. H. *Amer. J. Dis. Child.* 1937, **53**, 760.
10. North, E. A., Keogh, E. V., Anderson, G. and Williams, S. *Aust. J. exp. Biol. med. Sci.* 1939, **17**, 275; North and Anderson, *Med. J. Aust.* 1941, **1**, 754.
11. *Nature, Lond.* 1941, **148**, 335.

Annotations

THE HEN AS MIDDLEMAN

FOR years we have been taught that as a middleman between vegetable products (particularly grain "offals") and human food the hen, of all domestic animals, is the most wasteful and the cow the least. Some publicists even went so far as to give figures for the relative merit of cow, pig, bullock and hen; and the hen, as converter of fodder into food, was invariably placed last. The cow was reckoned to be five times as efficient as the hen and the pig ranked next to the cow. Thus it was considered uneconomical to use offals in producing beef, eggs and fowls (roasters and boilers), and the Government gave priority in feeding stuffs to dairy cows, both in the war of 1914–18 and in the present war, and rated hens last. It is not clear whether these assessments were based on the total dry constituents produced from (say) 100 lb. of fodder, or on the calories or the protein; and it is essential in assessing the efficiency of cow and hen that we should know what we are aiming at. It is possible, and indeed likely, that the order of merit would need revision if we considered the protein derivable by hen power from a given weight of fodder protein. This is clear from a recent article by E. T. Halnan [11] of the Animal Nutrition Institute at Cambridge. Halnan, being an authority on poultry, naturally defends the animal of his choice from the obloquy cast on it by agriculturists and dietitians. It seems that she has been maligned as a manufacturer of first-class protein from the proteins of lower biological value in offals. According to Halnan's estimates the hen converts 100 lb. of digestible fodder protein into 31·6 lb.

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of egg protein, or into 18 lb. of hen meat, whereas the cow can produce but 35·8 lb. from the same—a mere 4·2 lb. more than via eggs. Moreover Halnan's contention has been confirmed by the estimates of Leitch and Godden,[12] who have been led to rate the hen not quite so high as Halnan when regarded as an egg-protein factory, but higher than he did as a converter of fodder protein into hen meat. Conversions by pig and bullock cannot hold a candle to those by cow and hen. Surely then the rating of the hen by the Ministries of Food and Agriculture is false, and the question is pertinent now that first-class protein is so hard to come by and so expensive. It is when expense is considered that Halnan's thesis is seen not to be so cogent. The egg contains some 6–7 g. of first-class protein and costs the Government 3½*d.* to produce; the pint of milk contains 18 g. of first-class protein and costs 4½*d.* In other words it costs two and a third times as much to produce first-class protein via the hen as it does via the cow. From the point of view of economics the chivalrous defence of the hen by Halnan, Leitch and Godden is hollow. Where is the fault in their reasoning? It is paradoxical that the hen is almost as efficient as the cow in producing first-class protein and yet her product is at least twice as expensive. The explanation must be that the hen is a small animal with a high body temperature (104° F.) and the cow a large animal with less body surface relative to its weight and a lower temperature (101° F.). Consequently the hen uses up many more calories in her daily avocations than does the cumbrous and voluminous cow. She is an uneconomical manufacturer of food because her overhead expenses are extravagant. There seems not much reason then to abandon the older priority ratings of the hen, nor to increase one's own stock above the half-dozen which can be fed on household scraps.

TOXÆMIA OF PREGNANCY AND FUTURE PREGNANCIES

DURING the past twenty years much attention has been focused on the important question of what effect is produced on the subsequent health of the patient by hypertensive toxæmia of pregnancy. Most investigations of the subject are along one of the two main lines. First, large numbers of women who have previously suffered from toxæmia of pregnancy are followed up for a long time with particular reference to the development of hypertension, albuminuria, retinal changes and impairment of renal function, and a study is made of the morbidity- and mortality-rates from cardio-vasculo-renal diseases among them. Secondly, large-scale investigations are made to find what happens when such women are put to the specific and searching test of a subsequent pregnancy. Studies of these kinds have been in progress during the past few years in many parts of the world, but the war has interrupted them here and on the continent and much valuable information has thus been lost. It is therefore heartening to find an important paper coming from the active Women's Hospital at Melbourne. V. I. Krieger and R. M. Rome[13] collected 426 patients who had had various types of severe toxæmia of pregnancy and investigated them during their subsequent pregnancies, which were from 1 to 7 in number. These findings, in mnemonic form, were: a woman's chance of a subsequent toxæmic pregnancy is roughly 1 in 3 after one toxæmic pregnancy, 2 in 3 after two toxæmic pregnancies, and 3 in 3 after three toxæmic pregnancies. If she does not develop severe toxæmia in the next pregnancy after the initial toxæmia, only about 1 in 6 of her subsequent pregnancies is likely to be complicated by a severe toxæmia. Krieger and Rome are thus in full agreement with Young's suggestion that, if a patient has had two toxæmic pregnancies, further pregnancies should be prevented. Krieger and Rome also support the thesis that the earlier in pregnancy the albuminuria appears, and the longer it persists, the greater is the chance of recurrence in the next pregnancy. Their findings indicate a toxæmia recurrence-rate in the next pregnancy of 15% if the albuminuria in the initial toxæmia lasted up to 4 days, of 40% if it lasted 4–14 days, and of 63% if it lasted 15 days or over. They are so impressed by the seriousness of a prolonged albuminuria that they now terminate pregnancy in which the albuminuria fails to respond to treatment within 5 days, whereas originally they placed the limit at 3 weeks. They do not find any great difference in late prognosis between ordinary severe toxæmia, pre-eclampsia and eclampsia. Among other conditions, they found that over two-thirds of their cases of accidental hæmorrhage were followed by severe toxæmia in the next pregnancy, whereas pyelitis was hardly ever followed by a true toxæmia. Chronic nephritis developed in 8% of their patients in the next few years after a severe hypertensive toxæmia of pregnancy, but they did not find it any more likely to follow one type of toxæmia than another.

In addition to ordinary clinical studies they performed a large series of renal-function tests on these patients, during the initial toxæmic pregnancy and also in the follow-up period. They used a urea concentration-excretion test which detects degrees of impairment of renal function intermediate between the severe grades with raised blood-urea and the minor grades with an albuminuria only. Their figures show that some impairment of renal function is common in pregnancy and continues into the puerperium, but usually clears up within about 2 months after delivery. But there is no evidence in their paper that this impairment is in any way related to toxæmia of pregnancy. If chronic nephritis is excluded, there is no significant difference between the findings during or after pregnancy in patients with any type of severe toxæmia and in patients with an albuminuria lasting only one or two days. (Control figures for normal patients without a previous toxæmia are to be published later.) Furthermore there is no significant difference between the incidence of unsatisfactory renal function in the initial toxæmic pregnancy, in subsequent normal pregnancy or in subsequent toxæmic pregnancy. They conclude that the kidney is certainly not the primary cause of the toxæmias, but find the tests of value in differentiating cases of chronic nephritis.

CHEST PAIN IN HYPOTHYROIDISM

THE cardiovascular effects of myxœdema are no less striking than those of toxic goitre, though they are not so well known because of their relative rarity. Enlargement of the heart may be conspicuous on the X-ray screen though difficult to detect clinically, and sometimes this may be accompanied by congestive failure, but usually there is a remarkable absence of symptoms of abnormal cardiac function. It has been noted that after a therapeutic thyroidectomy for heart failure the symptoms may be considerably relieved yet the heart does not diminish and may even increase in size. Similarly angina pectoris has been successfully treated by total thyroidectomy and yet it may be a symptom in spontaneous myxœdema. The effect of thyroid extract on this latter type of case is uncertain; sometimes the pain is relieved along with the other symptoms, in others it is aggravated. In THE LANCET of Sept. 13 (p. 310) Dr. Herman Zondek described a form of hypothyroidism in which chest pain is a feature. The characteristic clinical aspect—puffy face, thick dry skin, scanty hair and lethargic appearance—is lacking, but these patients do present biochemical and circulatory changes usually relied on in the diagnosis of myxœdema: low basal metabolic rate, increased blood cholesterol and decreased circulation-rate. Precordial oppression is common, and Zondek regards this as angina though from the details he gives

12. Leitch, I. and Godden, W., *Tech. Commun. Bur. Anim. Nutrit. Aberd.* 1941, No. 14, p. 46.
13. *Med. J. Aust.* 1941, 1, 597.

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this diagnosis seems hardly warranted, the sensation being typical neither of effort angina nor of infarction angina. With the collapse, cold extremities and bradycardia which may accompany the thoracic distress the picture seems identical with that of the vasovagal attack or Gowers's syndrome. This is presumably what Zondek refers to when he mentions "angina pectoris vasomotoria" as entering into the differential diagnosis of his cases. A therapeutic test with thyroid extract is recommended for confirming the diagnosis and while this is valuable it should not be forgotten that thyroid extract may be of help in some conditions other than hypothyroidism through one or more of the physiological actions of the hormone. Two other signs described by Zondek are narrowing of the skin capillaries and enlargement of the left ventricle, though only one of the three cases described showed this enlargement and this patient had systolic murmurs in all areas. The effects of thyroid deficiency deserve closer study, especially in its mild forms, and a critical examination of Zondek's cases shows how difficult the diagnosis may be. The thoracic distress in these cases is usually of a type which does not permit the diagnosis of angina pectoris, but when cardiac pain is encountered in frank myxœdema it is essential that thyroid extract be given with caution. This is especially so if there is reason to think that cardiac infarction has occurred. The initial dose of the extract should not exceed gr. ½ daily and the effect should be observed for at least a week before increasing it. Any aggravation of the pain would of course demand a reduced dose or complete withdrawal of the drug.

HEALTH OF GERMAN TROOPS IN FRANCE

In a lecture given to German army doctors in Nancy in the spring of this year, Gänsslen [1] reviews the health of one of the German armies during the preceding 9 months. The general sickness-rate was low; this was attributed partly to favourable weather and partly to the unexpectedly rapid conclusion of the French campaign, which allowed the troops to settle soon into quarters almost as comfortable as those of peace-time. The chief epidemic diseases were those of the alimentary tract. Outbreaks of gastro-enteritis occurred, often traceable to contaminated food; sometimes organisms of the salmonella group were responsible, but in the almost pandemic outbreak in the summer of 1940 bacteriological investigation was inconclusive. Dysentery occurred fairly often, usually in mild form, Flexner's bacillus being commonest and Shiga's rare. Two small clinical points in its recognition are noted: that labial herpes, occurring in 20–30% of cases of non-dysenteric gastro-enteritis, is rare in dysentery; and that "to him who has a fine nose the stale semen-like smell of the stool will suggest dysentery." Among the sequels of dysentery the familiar arthritis was met with, arising in almost any joint; and attention is drawn to urethritis and conjunctivitis, both of which are naturally liable to be attributed to other causes. A controlled observation of the effect of anti-dysentery serum on alternate cases (Shiga infections being excluded) showed that it had no clear beneficial action. Hypertonic saline given intravenously and blood-transfusions were valuable measures in the severest cases. A trial of sulphanilamide was begun but not concluded. Dysentery was largely confined to the low-lying or flat country in northern France and Flanders; from the troops and prison camps in the well-drained, more thinly populated uplands of the Vosges it was almost absent. The German army in question was apparently not free from enteric fever, though cases were not numerous; paratyphoid occurred oftener than typhoid. No mention is made of the extent of preventive inoculation. Small epidemics of catarrhal jaundice occurred without ascertainable cause. Cerebrospinal fever reached the peak of its incidence in the spring, and then almost subsided; its fatality was probably under 20%. Sulphanilamide or its derivatives is credited with influencing the severity and mortality of the disease, but Gänsslen is surprisingly lukewarm in his approval of it. There is no mention of chronic meningococcal septicæmia. A small outbreak of zinc poisoning —not new to the Germans, who had already experienced it on the Westwall—with acute gastro-intestinal symptoms was caused by the preparation and serving of salads in zinc vessels.

1. *Dtsch. med. Wschr.* April 25, 1941, p. 455.

MIDDLE-CLASS PROVIDENCE

There is a wide gap between even a heavy bill from a family doctor and the cost of a serious illness or operation involving nursing-home and surgeon's fees, and many people with moderate incomes who are well able to pay for ordinary medical treatment are stumped when faced with an expensive emergency. Since 1921 the British Provident Association has been tempering the wind to these semi-shorn sheep, lately Bristol has launched its Intermediate Contributory Scheme for them, King Edward's Hospital Fund is sponsoring a provident scheme for London,[1] and now Lord Nuffield has given £150,000 to set up a Provident Guarantee Fund to encourage the formation of many more insurance schemes of this kind. The new fund will guarantee the solvency of contributory schemes set up in the provinces, in Scotland, and in Northern Ireland to cover the cost of specialists and surgical treatment in hospital pay-beds and nursing-homes for the middle and professional classes. It is hoped that these provincial schemes will work alongside the hospital councils with which the Nuffield Provincial Trust is associated. The guarantee will be conditional on the scheme's approval by the trustees of the fund, and this benevolent supervision will enable the associations to offer their members a uniformity of benefit and facilities for transfer which are unusual in local enterprises. The address of the fund is 16, King Edward Street, Oxford.

ECONOMY IN PHENOL AND ASPIRIN

There is need for economy in phenol and certain allied substances which have so far been readily available. In a circular letter to hospitals and medical officers of health the Ministry of Health asks that phenol, salicylic acid, acetylsalicylic acid, sodium and methyl salicylate, and phenolphthalein should be used sparingly. It should not be difficult to devise substitutes for carbolic acid itself and for phenolphthalein, but the salicylates, and especially aspirin, will be difficult to cut down. To be fully effective an appeal for reduction in the consumption of aspirin will have to be made to the public direct, for only a small proportion is now sold on prescription. Nothing will presumably be gained by giving phenacetin or phenazone instead, for these are also derivatives of phenol. Doctors can no doubt help by prescribing aspirin and the salicylates only when there is a definite indication for them, and where aspirin must be given repeatedly it may be found that a smaller dose suspended with tragacanth is as effective as a larger in tablet form.

PECTIN AS A BLOOD SUBSTITUTE

The provision of enough whole blood and serum or plasma for use in shock or hæmorrhage is not always easy, and new materials are being tried out as substitutes. Of the older substitutes, gum acacia accumulates in the liver and may depress protein regeneration, while gelatin is antigenic. More recently isinglass has been used with success,[2] but this awaits confirmation. Meanwhile Hartman and his associates [3] suggest pectin solution

1. *Lancet*, 1939, 1, 1390.
2. Taylor, H. B. and Waters, E. T. *Canad. med. Ass. J.* 1941, 44, 547; see *Lancet*, Aug. 2, 1941, p. 135.
3. Hartman, F. W., Schelling, V., Harkins, H. N. and Brush, B. *Ann. Surg.* 1941, 114, 169.

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Its advantage, apart from ease in preparation, is that a 0·5% solution has about the same viscosity and osmotic pressure as whole blood. A simple solution is too acid and requires buffering to the correct pH. Good results were obtained in animal experiments and the substance was found not to be antigenic, neither did it depress liver function. Preliminary trials on human subjects showed that it was capable of raising the blood-pressure in shock and the rise was maintained during the time of the experiment. Though pectin is retained for a short time in the blood and liver it is rapidly excreted by the kidneys. It remains to be seen whether it will stay in the circulation long enough to overcome all tendency to shock.

SULPHADIAZINE AND SULPHONAMIDE E.O.S.

THE observant physician has been learning in the past few years when and how to use each of the available sulphonamide compounds to the best advantage of the patient—sulphanilamide for streptococcal and coliform infections, sulphapyridine for pneumococcal, sulphathiazole for staphylococcal, and one of the last two for meningococcal and gonococcal infections. But many doctors are not so discriminating, and use sulphanilamide or sulphapyridine for all manner of infections without regard to the fact that the treatment may be more harmful than the malady. Sulphapyridine in particular needs to be used with care for not only may it upset the patient's stomach and appetite but it also tends to form crystals in the urinary tract unless the fluid intake is liberal, a tendency which it shares with sulphathiazole. Again, these drugs are often given in inadequate doses, and if this practice continues we may be faced with drug-fast strains of the common pathogens and infections which are entirely resistant to sulphonamide-therapy. Sulphathiazole seemed to have advantages over the earlier preparations, being effective against most of the pathogens and much less irritating to the stomach than sulphapyridine. It has two disadvantages, however, for it is very quickly excreted, so that a high concentration in the blood is difficult to maintain, and at present supplies are limited.

The maintenance of an adequate blood-level of the drug chosen without too frequent dosage (ill patients should not have to be wakened in the middle of the night) is most important, and sulphadiazine, the pyrimidine analogue of sulphapyridine, is endowed with the valuable property of producing a higher sustained blood-level than sulphapyridine and sulphathiazole[1] with the same dosage. Moreover, it does not easily upset the stomach, and apparently is not concentrated in the kidney, as sulphapyridine and sulphathiazole are, so that there is less risk of kidney-damage. Finland, Strauss and Peterson[2] have lately reported the results obtained with sulphadiazine in a variety of clinical infections among 446 adults. In the largest group of 316 cases of pneumonia there were 178 cases of primary pneumococcal pneumonia, of whom 19 (10·7%) died, which may be compared with a fatality of 16·3% among 687 patients treated the previous year with sulphapyridine or sulphathiazole with or without specific antiserum. Of the 19 patients who died, 8 were moribund on admission and 9 of the others were old people who died after the pneumonic infection had apparently been overcome. Complications were relatively few and three-quarters of those who recovered were afebrile within 36 hours of beginning treatment. There were 29 cases of staphylococcal pneumonia, occurring mostly as a complication of influenza. Some of these responded promptly to sulphadiazine, others ran a more chronic course with abscess-formation and pleural effusion; 6 of them died. The usual course for adult patients with pneumonia was an initial dose of 2–4 g. followed by 1 g. 4-hourly until the patient had been afebrile for 3–5 days, which usually meant treatment for 6 days with a total dosage of 40 g. or less. Finland and his colleagues thought the results compared favourably with those obtained with the earlier sulphonamide preparations or with serum. They were also impressed with the effect of the drug in tonsillitis, erysipelas and acute, but not chronic, urinary infections. Their 4 cases of pneumococcal meningitis treated with the drug all died. Toxic symptoms were of the kind which other drugs of the sulphonamide series produce but were on the whole mild and infrequent. One patient developed ureteric colic with hæmaturia followed by anuria which was relieved by ureteral catheterisation. Sulphadiazine was also used with good results by Dingle, Thomas and Morton[3] in the treatment of 13 cases of meningococcal meningitis and 1 case of meningococcal septicæmia: 1 patient with meningitis died ten hours after admission. Dowling and others[4] employed much the same dosage as Finland in their 115 patients with pneumococcal pneumonia, though lately they have raised the initial dose from 2 g. to 4 g. or even 6 g. In their whole series the fatality was 11·3%—the same figure as in their previous series on sulphapyridine, but it was only 6·3% in the 64 patients in whom sulphadiazine was begun with in the first four days. Serum in addition was given in 16 older patients, of whom 2 died. Toxic effects were very slight, and never made it necessary to stop giving the drug by mouth.

Mutch[5] has lately described his experience with sulphonamide ethyl-α-sulphonate, prepared by Imperial Chemical Industries. This compound is freely soluble in water, is of low toxicity and is hydrolysed in the body with the liberation of sulphanilamide. Mutch has used it in a variety of infections and he reports a representative series of 34 cases of meningococcal meningitis with a fatality of 9% and few unpleasant side-effects. The molecular weight of Sulphonamide E.O.S. is nearly twice that of sulphanilamide, so that larger doses must be given, but Mutch suggests that since it can be administered in an almost tasteless solution it may prove particularly useful for infants and fastidious, vomiting or comatose patients.

HEALTH OF THE INDUSTRIAL COMMUNITY

IN years to come 1940 will count as a significant one in the long struggle for improved labour conditions. War has acted as a catalyst and brought about large-scale organic changes which in peace-time would have seemed impossible. It would be facile to call these changes a bloodless revolution, for there was at the same time an increase in industrial accidents as well as an intensification of aerial bombardment of the industrial towns. One side of this great story can be read in the annual report of the Chief Inspector of Factories summarised on another page. The report which has lost its familiar blue cover and its statistical tables contains an account of all the important developments during the year leading to improved welfare conditions, the term "welfare" being used in a broad sense to connote not only the comfort but also the well-being of the workers and to include measures to prevent accidents and to maintain health. As far as it goes the report is satisfying, but medical readers will regret the omission of anything helpful about industrial diseases and poisonings, which is peculiarly unfortunate when so many of them are facing for the first time some of the major problems of factory life. Steps should be taken to circulate a fuller version of Dr. J. C. Bridge's report among the doctors whom it so closely concerns.

1. See *Lancet*, 1941, **1**, 217.
2. Finland, M., Strauss, E. and Peterson, O. L. 1941, *J. Amer. med. Ass.* **116**, 2641.
3. Dingle, J. H., Thomas, L. and Morton, A. R. *Ibid.*, p. 2666.
4. Dowling, H. F., Hackman, C. R., Sugar, S. J. and Feldman, H. A. *Ibid.*, **117**, 824.
5. Mutch, N. *Brit. med. J.* Oct. 11, 1941, p. 503.

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Special Articles

TOWARDS A NATIONAL SERVICE IN CLINICAL PATHOLOGY

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THE present war must bring about great changes in the organisation and practice of medicine in this country, and by general consent many changes are long overdue. In face of this prospect it is the business of all those interested to take counsel with a view to directing developments into proper channels. Not least important is the place of pathology and the function to be filled by laboratories and laboratory workers.

The standard of academic teaching and research maintained by the medical schools and research institutions of this country is high, but clinical practice has for more than a generation been slow in embodying the full possibilities of laboratory work. Only recently pathology, bacteriology and biochemistry and their allied studies were being referred to as "ancillary" to clinical medicine. The war of 1914–18 revealed a similar schism between the clinical practice of medicine and its basic sciences in this country, and clinical units were established in certain of the London teaching hospitals to restore unity within the body of medicine. How far the gap still remains open can be judged by all who have been in contact with the graduates of the medical schools over the last twenty years. The clinician by the bedside may now ask for more laboratory tests than his predecessor of a generation ago, but increasing demands on his time make it difficult for him to keep sufficiently in touch with the many possible lines of investigation to enable him to select the most appropriate and gauge correctly the values to be attached to the bare results of laboratory procedures. The laboratory worker on his side has often chosen this branch of medicine because of lack of interest in the clinical side. Purely academic research, in the long run of deep importance, has been and will continue to be done by workers not interested in and divorced from clinical medicine; but for the immediate treatment of the sick there is required a body of medical men and women fully acquainted with all the details of laboratory technique in its application to clinical medicine, and interested equally both in clinical and laboratory work. Only those so trained and equipped are in a position to direct, or help to direct, both the laboratory investigation of clinical problems and the interpretation of results.

The field to be covered by such workers may for lack of a better term be described as clinical pathology. This term has been regarded with some disfavour in academic circles in this country, partly because it is something of a hybrid including all the basic sciences of medicine which form, in academic institutions, the subjects of separate departments or even professorial chairs; and partly because of the misguided activities of some of its earlier practitioners.

THE PLACE TO BE FILLED

Clinical pathologists are now attached to all the larger non-teaching hospitals and even before the war the demand was increasing; the development of the E.M.S. hospital service has led to a call for many more than are now available and inducements are being offered to promising young medical men and women to take up this branch of work. The E.M.S. is a living and growing concern and it is clear that it cannot remain merely "emergency"; it is developing and will continue to develop as an integral part of the nation's medical service and in so doing must profoundly affect the whole future of medical practice. It is proper at this time to consider the rôle of clinical pathology in the nation's medical organisation, and the future status of its practitioners. Naturally it can only properly be practised by those in close and continuing touch with clinical medicine. From this it follows that its seat must be in laboratories forming an integral part of large and active hospitals. Neither the laboratory established by a local authority for the purpose of dealing with public health pathology and bacteriology, the university laboratory maintained for the purpose of teaching and research, nor the isolated laboratory of any sort is fitted for the proper pursuit of clinical pathology. It can only function efficiently in a laboratory which is part of an institution for the care of the sick.

Clinical pathology must, then, be closely bound to the national hospital service; in the E.M.S. it is already so bound. It is evident that the national hospital service is even now entering on a phase of rapid evolutionary change and it seems likely that this change will proceed along the lines of regionalisation. The British Hospitals Association has long been working for the regional grouping of the voluntary hospitals; for E.M.S. purposes such regional grouping of hospitals is already in being; the work of the Nuffield Provincial Hospitals Trust is, with the support of the Minister of Health, already beginning to make itself felt, and there is reason to hope that there will in due course appear a hospital service calculated to meet all the hospital requirements of the nation and including without distinction all hospitals—voluntary (both teaching and non-teaching) and municipal. The country will for hospital purposes be divided into a number of regions and these again into divisions, each centring round a key hospital. Most of the regions will contain a teaching hospital; this will serve as the key hospital of its own division and should occupy a unique position among the key hospitals of the whole region. Its position, however, must depend on its own merits and be that of "primus inter pares" rather than one of unquestioned supremacy. All key hospitals will require their own departments of clinical pathology and around these will centre the work of their divisions, including work for the hospital itself and for the area covered by the hospital.

The proper functioning of the clinical pathological department of an active hospital must bring it into contact with every department of the clinical work of the hospital. It should not merely be a place where specimens are examined and reports on them issued. The place of the clinical pathologist is in the wards as well as in the laboratory. It is his business in consultation with the clinical staff to assist in determining the lines to be pursued in the investigation of clinical problems and the interpretation of results. Much of the work at the bench must be performed by skilled technicians, but it is his duty to see that it is properly done, and it is he who must introduce new techniques as they become available and generally see that the work of his laboratory is kept at a due pitch of efficiency; and he must ensure that full and proper use is made of the facilities of his department. This entails close touch with the clinical staff. He must also be vigilant against the clogging of the laboratory by specimens sent down as a matter of unthinking routine, the examination of which can have no real bearing on investigation or treatment.

A DOMICILIARY SERVICE

The needs of the division, apart from those of the hospital, can to some extent be met by the delivery at the laboratory of specimens for examination. Such an impersonal service, however, can no more meet the needs of the community as a whole than it can that of the hospital. The clinical pathologist must be available in person to assist, in consultation, in the investigation of clinical problems outside as well as inside the hospital. The clinical pathological service must be domiciliary as well as institutional. As matters now stand such domiciliary consultations with the clinical pathologist are available only to those in a position to pay consultants' fees. A national service must minister to the needs of the whole community, not excluding its less prosperous members. The provision of such a domiciliary service offers no insuperable difficulties. The details of its constitution may well differ from region to region and from division to division. In some key hospitals certain of the clinical pathological staff might elect to serve on a part-time basis, devoting some of their time to private practice; these might possibly be those sojourning only temporarily in the service with the intention of proceeding later to purely clinical work. Alternatively the domiciliary work might be undertaken by the whole-time staff and the fees accruing from it be placed to the credit of the service. There are

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advantages and disadvantages in both systems and it would be desirable that for a time both should work side by side; the course of events would show the system most worthy of adoption. Early standardisation is not desirable, and might prove never to be desirable: events might well show the same system not to be equally suitable to all areas.

Any hasty and ill-considered attempt to impose a rigid uniformity on the clinical pathological (as on any other) part of the national hospital service would be disastrous. The national hospital service even as now existing offers one of the best examples of our traditional genius for devising and maintaining locally institutions suited to local needs. It is accepted that the national hospital service must receive financial assistance from the state and the acceptance of financial assistance naturally carries with it certain obligations; the fulfilment of these obligations must not entail the sacrifice of local effort and initiative and its replacement by bureaucratic rule. It is a wise saying that "it is an injustice, a grave evil and a disturbance of right order for a larger and higher organisation to arrogate to itself functions which can be efficiently performed by smaller and lower bodies." The national hospital service of the future must allow to its component hospitals a degree of autonomy subject only to the general direction of divisional and regional hospital councils, on both of which the hospitals should be able to make their voices heard.

CLINICAL PATHOLOGY AND PUBLIC HEALTH

Clinical pathology must necessarily have contacts with what is usually described as public-health pathology. The concern of clinical pathology is the individual case and that of public-health pathology the community as a whole. The two spheres impinge on each other and it is neither possible nor desirable to draw any exact frontier between the two. Much confusion has resulted from the habit of regarding the sphere of public health as comprising anything ordained or governed by administrative statutes. Because there is a statutory obligation on local authorities to arrange for the examination of throat swabs for diphtheria this is regarded as coming within the scope of public health. It may and usually does so, but it also falls within the sphere of clinical pathology. The same thing applies to all forms of examinations in connexion with disease, epidemic or likely to become so. From the standpoint of the individual patient these examinations fall within the scope of clinical pathology; from the standpoint of the epidemiologist they fall within the scope of public-health pathology.

The matter is further complicated by the fact that the laboratories of many hospitals throughout the country undertake the public-health work for their areas. This is not the primary business of the hospital laboratory but the work brings much-needed financial assistance to the laboratory—in many cases it is its main source of income, without which it would never have been established and could not be maintained. Under the regionalised system envisaged by the Nuffield Trust the hospital would be free of the necessity of seeking extraneous sources of income for the maintenance of its laboratory. The laboratory and its service would become a part of the regional (and through it of the national) hospital service and would be in a position to extend its full energies within its proper field of clinical pathology.

With the development of municipal hospitals, local authorities have found themselves under the necessity of arranging for much pathological work for individual patients in their charge; because performed under statutory sanction or obligation this work has also come to be regarded as falling within the definition of public health. The fact that it is performed under statutory sanction, however, does not alter the fact that such work for hospital patients falls within the scope of clinical and not of public-health pathology. In many instances local authorities have established laboratories in the hospitals under their charge. This is the right and proper course; such hospitals with their laboratories occupy a place in the hospital service of their region. In other areas, in which local authorities have in the past established central laboratories for dealing with the pathology and bacteriology of epidemic disease, the clinical pathology of all the municipal hospitals has been centred on these laboratories. This entails the transport of specimens from the hospitals to the central laboratory, and renders impossible that close and continuing touch with clinical work on the part of the laboratory staff essential for the proper practice of clinical pathology. These central laboratories have an important function to fulfil in the national medical service: that function, in fact, for which they were established—to deal with the mass control of epidemic diseases. At present their work is largely confined within their own walls. Measures for the full control and investigation of epidemic disease must extend into the field, and must take the staff outside the laboratory into the hospitals and the homes of the people, not primarily for the purpose of investigating the individual case but to control the spread of epidemic disease. The field laboratory unit until lately did not exist in this country. Some are now fully embodied and others exist in a skeleton form; workers in one such unit have testified to me with enthusiasm about the value and the interest of the work. In such units the public-health pathologist and the clinical pathologist must work side by side, but the control of such units would fall to the central public-health laboratory of the region concerned.

PERSONNEL

The clinical pathological service must be the concern of the key hospital; among these will be both those with and without medical schools. In addition to their other functions the departments of the teaching hospitals will be concerned also with the teaching of students; their staffs will on this account require to be larger than those of non-teaching hospitals.

In the medical schools of teaching key hospitals there may be departments of pathology, bacteriology and biochemistry, each under the direction of a separate head and each with its own laboratories. The existence of such departments, whether separately or under one head, will not obviate the need for a hospital department of clinical pathology under its own director. Whether in teaching or non-teaching hospital the director will require to be one of sound clinical training, well grounded in physiology and thoroughly acquainted with all branches of laboratory work in relation to clinical medicine, though not necessarily equally adept in all. The director of clinical pathology in a teaching hospital will have the immense advantage of ready access for assistance and advice to the staff of the academic departments, and such posts will naturally attract the best workers in the field. In both teaching and non-teaching hospitals the director will require the assistance of a staff varying in size with the size and activity of the department.

From the assistants in the department of key hospitals will be drawn the future directors of the national hospital laboratory service. Not every medical graduate has that taste and aptitude for the combination of clinical and laboratory work which must go to the vocation to clinical pathology. No assistant should be admitted to the staff of the department of clinical pathology until he or she has done at least one year in house posts, in the course of which evidence of the vocation should have shown itself. A period as assistant in the laboratory of one or more of the special departments of a teaching key hospital would be a valuable part of the training of the assistant clinical pathologist; this period might be taken at any time after he had done his resident house course, preferably after a term of apprenticeship as junior assistant in the department of clinical pathology; but it should by no means serve as a substitute for such a junior assistantship.

The most junior assistants in the department of clinical pathology would be on the same footing as the resident house-officers. For one year at least, and possibly longer, they should live in the hospital. This is essential for the sake of both the hospital and the officer: for the hospital because the services of the hospital must be available throughout the twenty-four hours, and for the officer because by living in the hospital as a member of the residents' mess he can best attain that close and continuing touch with clinical medicine which is so necessary a part of his training. While resident the salary and emoluments of the assistant clinical pathologist

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would be at the same rate as that of other house-officers of comparable seniority and such posts would be whole-time.

The remuneration of the heads and non-resident assistants of the clinical pathological staffs of the key hospitals remains to be determined. As things are, the clinical pathologist attached to a voluntary hospital depends partly on remuneration by the hospital and partly on private work. The remuneration from the hospital may be financial or may take the form of the right to use the hospital laboratory for private work, or both. In the municipal hospitals the post of pathologist is usually salaried, pensionable and whole-time. There is something to be said for and against both systems of remuneration. For partial remuneration with the right to private practice it can be urged that this system enables the hospital to get the services of a pathologist more cheaply than if it had to pay in salary his full market value; under a regionalised hospital system with financial assistance from the state this argument would largely lose its cogency. But the contacts with patients and medical practitioners attained in the course of private practice are valuable in the development of the pathologist. Against the system is the objection that where the treasure is there will the heart be also; and that the temptations of private practice may seduce the pathologist into neglecting his hospital work. The salaried whole-time system makes it possible for the pathologist to give the whole of his time and energies to the work of his hospital. It suffers from the disadvantage that whole-time posts may attract the unambitious and unenterprising, and that even the most promising once ensconced in a safe job with reasonable salary and the sure and certain hope of a comfortable pension may lapse into lethargy and desuetude. Ideally it should be possible to devise a system under which merit would ensure advancement and its absence elimination; but experience shows how difficult this may be under the terms of human institutions.

Advocates of both systems of remuneration are to be found among clinical pathologists of all degrees of experience and seniority. Granting that the terms of remuneration are reasonable I have heard both senior workers of long and varied experience and juniors only recently entered on the field unite to speak in favour of a whole-time service. The subject calls for wide discussion and exchange of views. Good work has been and can be done under both systems and a hasty decision in favour of the universal application of either would be highly undesirable. Arrangements suitable to one type of hospital or to one group of hospitals are not necessarily so to all.

Under a regionalised hospital service clinical pathology would form part of the regional and national hospital services. Under a system of modified individual autonomy on the part of the key hospitals the terms of employment offered to clinical pathologists by individual hospitals might, at any rate in the earlier stages of development of the system, differ to some extent. The most desirable terms would in time become apparent. The establishment of clinical pathology within the national hospital service would make this branch of medicine far more attractive to future generations of medical men and women. Up to the present the beginner, in attaching himself to a non-teaching hospital, has had to face the realisation that in so doing he has established himself in a post from which there is little likelihood of his translation. In a regionalised national service the beginner would be starting at the foot of a ladder which might bring him eventually to the highest places in the national service. Further, instead of having to work in comparative isolation the clinical pathologist attached to a key hospital would be in a position to maintain constant touch with other workers in his region, to specialise in any subject of particular interest to himself, to assist others in this and to receive from others help and advice in their own specialties.

Such a national service in clinical pathology could not fail to become a great force in the advancement of medicine. The need for it is shown by the repeated representations of practitioners under the National Health Insurance Acts for the inclusion of facilities for laboratory investigations in the panel benefit, and by similar demands by the British Medical Association. That the need has not before now become so apparent and urgent as to force Governmental action is due to the efforts of the voluntary hospitals which have made a partial service available through their outpatient departments. It is right that further developments should continue along these lines with the national service in clinical pathology embodied in the national hospital service. In the development of both it is essential for safety to steer a course between over-centralisation and laissez faire. For development to proceed along the proper channels guidance must come not by edict from above but through the united effort of all those concerned.

MEDICINE AND THE LAW

Refusing Consent to Amputation

A PARENT who "wilfully neglects" a child by failing to provide adequate medical aid commits a misdemeanour. It was held in Oakey *v.* Jackson in 1914 that the refusal to allow an operation for adenoids might amount to neglect. Recently a father was indicted at Glamorgan quarter sessions for neglecting his six-year-old son (who was suffering from tuberculosis of the left knee) by refusing to allow amputation of the limb (R. *v.* Imms). The prosecution offered medical evidence that, while the operation might prove fatal, the boy would die if no operation was performed. Dr. Alex. Brownlee, medical superintendent of the Glan Ely hospital, gave the history of the case. The patient had been most carefully nursed for 14 months; he was able to walk when he was discharged. Last April, however, he was readmitted to hospital. His condition was progressively deteriorating; he was beginning to suffer from chronic poisoning of the system due to the diseased knee. "If the life of the child is to be saved," said the witness, "this amputation should be performed." It was impossible to save the limb; operation was the only hope of saving the boy's life; the patient's condition was becoming so serious that it would soon be too late to operate; "I think he will die if it is not done." A consulting surgeon confirmed this view. The father explained that he refused because he was afraid that the shock of the amputation would kill his boy; even if he recovered, he would be a cripple for life; "if I consented to the amputation and Terence died, I should have signed his death warrant; if I thought he would recover, I would consent at once." His counsel took the points that the father had never been told of the boy's life being in danger and that the refusal was not absolute—not "I will never consent" but merely "I will not consent at this stage." The jury returned a verdict of "not guilty" without leaving the box.

After a long series of enactments and re-enactments the law is now to be found in section 1 of the Children and Young Persons Act, 1933. Judges have construed "wilfully" as done deliberately and not by inadvertence, "neglect" as the absence of such reasonable care as an ordinary parent would reasonably use for the care and protection of the child. So said Lord Russell of Killowen in R. *v.* Senior (1899) where a nine-months-old infant died of diarrhœa and pneumonia and the prosecution proved that life would certainly have been prolonged and in all probability saved if medical assistance had been provided. R. *v.* Morby (1882), where the child suffered from confluent smallpox, had shown that the parent could not be convicted unless it was proved that death was caused or accelerated by the omission to call in medical aid. Subsequent prosecutions of persons holding the faith of the Peculiar People, who refused to call in a doctor because they bona fide believed such a course to be wrong, established that the fact of conscientious objection was no defence to a charge of manslaughter if the neglect to call in medical aid accelerated the death of a child in the care or custody of the accused. The Senior case showed conclusively that honest religious belief did not avail the accused. It is one thing, however, for judges to lay down the law and another thing for juries to convict a father whose obvious affection for his son has placed him in a tragic dilemma. The almost superstitious reluctance to allow surgical operations is a survival of which practitioners cannot fail to be aware.

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AN UNDERGROUND EMERGENCY HOSPITAL FOR AIR-RAID CASUALTIES

BY THE COMMANDANT OF A GENERAL HOSPITAL

WHEN he has completed the organisation and equipment of his hospital for war service the first duty of a commandant is to decide what he will do if it becomes unusable in consequence of explosion, fire, interruption of water-supplies or the presence of delayed-action bombs. Theoretically such a situation is met by switching casualties to another hospital but in heavy raids this may prove impracticable for many reasons—it may be impossible to communicate immediately with the officer in control of ambulances, and roads may be so blocked that alternative routes to other hospitals are not easy to find. In any event, by prolonging the journeys of the wounded, and by condemning to inactivity the staff of a hospital when its services are most required, switching is not an ideal solution of the problem. I therefore decided to find and equip premises as a sort of reserve or second line to which staff and casualties might rapidly be transferred so that surgical work might continue during a blitz if the hospital was damaged or overcrowded.

CHOICE OF A SITE

From every point of view it was desirable that such reserve accommodation should be safer than that of a civilian hospital built to let in light and not to keep out bomb splinters; that it should be as far as possible immune from the nuisances of breaking windows and noise; and that its provision should not involve heavy initial cost or constant expense in overhead charges during quiet periods, or an idle staff permanently in residence for its care. Eventually I approached the general manager of a large store. This steel and concrete building is within 300 yards of my hospital and has an island site. There are nine floors and two of them are underground; the lowest is used for storage and has a subterranean passage for the delivery of merchandise. The passage slopes away from the shop and would protect it from serious flooding. The next floor—the basement—is used for shopping, and contains a kitchen and a restaurant in which thousands of light meals are served daily; there are numerous lavatories and several lifts, two of which are designed for heavy goods and communicate directly with a covered bay and a loading platform for lorries. There are also several wide staircases. In another part of England similar premises belonging to the same firm suffered several direct hits in one night from heavy high explosive and were set on fire by oil bombs. Great damage was done and the lowest floor was flooded, but the basement remained intact.

With the consent of the hospital officer I proposed that space in the basement might be set aside for the construction of an efficient operating-theatre, an X-ray room and the installation of sterilising equipment; that arrangements should be made for the rapid clearance of goods from the floor in an emergency, so that hospital beds could be set up as space became available; and that the kitchen should be used for feeding patients. Access to the basement during an air-raid was to be by the covered lorry bay which was well adapted for the unloading of ambulances and by the heavy goods lifts which would take stretchers. These proposals were approved by the board of the store, who generously decided not only to make no charge for the use of their valuable premises but also to provide similar facilities in other large towns if the arrangement proved useful. With the skilful and enthusiastic coöperation of the staff all the structural alterations, plumbing, painting and wiring were completed in three weeks. The total cost (exclusive of equipment) was about £1000, though it would have been larger but for the generosity of the firm. Later the mayor collected funds privately for the provision of an engine and apparatus to generate an independent electrical supply for light and X-ray work if the city mains were cut.

SCOPE AND EQUIPMENT

In its final form the nucleus of the underground emergency hospital had a floor space of 2867 sq. ft., which could be extended to nearly 8000 sq. ft. It is separated from a busy shop by interlocking wooden screens. The theatre measures 620 sq. ft., and is designed for three tables, but it will take four when necessary. It is ventilated by forced draught through fine gauze screens. To test its efficiency several operations were done in it (including a bone case) before it was used in a raid. No sepsis occurred. Sterilising is done by electrical heating. If the current fails there are gas boilers in the kitchen and as a last resort oil stoves. Eighteen beds are kept ready for use. On each of these five extra mattresses (with sheets and blankets spread and tied to them with string) are placed, to be carried to other bedsteads as they are put up. Within an hour, space in the shopping area can be cleared for fifty beds, and within two hours a hundred and twenty beds are ready for use. The important work of clearing goods is carried out by the store night staff when they receive warning from the hospital, and the speed and efficiency with which it is done is astonishing. Standing orders for the use of the basement are now as follows:—

1. When 25 casualties have been admitted to the general hospital the store will be warned and will assemble their clearing staff.

2. When 50 casualties have been admitted to the general hospital, the basement will be cleared and nursing and registration staff will be transferred to it.

3. When 75 casualties have been admitted to the general hospital, ambulances will be sent to the store until 75 cases have been admitted; thereafter the casualties will be divided equally. At this stage medical and surgical staffs go to the basement.

The bed space is enclosed by interlocking screens and can always be adjusted to the number of patients—the

Some of the eighteen beds ready for use at a moment's notice.

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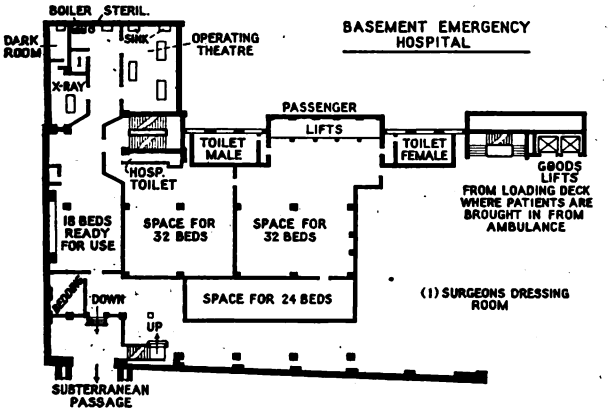
hospital expands and contracts like a gigantic concertina. For the separation of sexes light ward screens are used. A refrigerator and equipment for the blood-transfusion service have been installed, and supplies are changed regularly. A bed-pan washer has been connected to the lavatory drain.

IN ACTION

The most severe test of this new model hospital occurred early this year. One night, when switching soon became impossible, a large number of casualties were brought to the general hospital. One-third of these were sent on to the store and were admitted within an hour. Work in the theatre began shortly after midnight (15 minutes after the first admission) and by 9.30 next morning over 70 cases had been dealt with (including several abdominal wounds) and most of these had been X rayed. The remainder did not require, or were unfit for, urgent surgery. The general hospital later became unusable and was evacuated; for a week, while repairs were carried out, the underground hospital remained fully extended and dealt with casualties in the centre of the city. Most of the patients admitted to the basement were evacuated within 24 hours; all of them within 3 days.

The X-ray department contains a 4-valve shock-proof unit with tilting couch and screening apparatus. It cost £1000 and was provided by the hospitals of the city in the hope that the Ministry of Health would reimburse them for it later. It has been suggested that we have been extravagant and should work with a smaller mobile set;



I do not agree. In my hospital we have dealt with over 1500 air-raid casualties and experience of them has taught me that efficient radiology is indispensable. For efficiency the X-ray room must be easy of access from the theatre and its plant must be capable of continuous use. Localisation of foreign bodies and the treatment of fractures is controlled by screening. We use very few films, and they are mostly required for dubious abdominal perforations in fat people and for possible penetrations of the skull. No light set, I am informed, will long survive the amount of screening that we have several times employed. The work is mostly done by the sisters, technicians and students of the radiological department, since there are not enough expert radiologists for blitz work. Fortunately the technique is simple—even a physician can learn it in quite a short time.

I have read much about the organisation of staffs of hospitals; the writers have been concerned to define exactly the proper functions of a surgeon and a physician in times of stress. Most of them seem to miss the essential point—that the best organisation of any staff is that which is best adapted to the capacity of the individuals that compose it. I find it difficult to think of any of my colleagues as a surgeon or a physician; possibly it is the rude air and manners of the provinces that keep my friends from neatly falling into patterns orthodox and convenient for classification; they remain peculiarly, distressingly, and sometimes emphatically, individual. With material so unruly I have yielded to the belief that organisation of staffs should vary from hospital to hospital and that the organisation of a particular hospital should be elastic enough to permit variation of routine to suit the individuals who are doing

Part of theatre 17 ft. below ground.

the work at a particular time. Matron assures me that the same is true of nurses. This digression is not entirely irrelevant to our underground annexe. The first essential to the successful working of such a place is a supply of nurses capable of taking the theatre. This can only be obtained by rapid and intensive training, which involves frequent changes in the staffs of theatres and interferes with their normal slick civilian routine. The surgeon who will tolerate this for the larger good is above rubies.

I have reached two other conclusions: first, that the place for a skilled and active surgeon in a blitz is in the theatre. There he may well supervise juniors at two or three tables, but he should not leave the theatre except to visit the X-ray room. Secondly, competent physicians are well able to decide the best order in which cases should go to the theatre and to supervise resuscitation. In general they should work with the same surgeons but this should not be a rigid rule.

Our aim in a heavy raid is to keep six to eight tables going (three or four in the main hospital and three or four in the underground annexe) as long as casualties require treatment in the theatre. We have found that by keeping the surgeons in the theatres, by arranging for X-ray work close by, by training larger numbers of nurses for theatre work and by using physicians for sorting and resuscitation we can deal with two or three patients every hour at each table over a long period.

CONCLUSION

This experimental underground hospital has shown that it is possible to provide a reserve of theatre accommodation, X-ray facilities and beds in large cities at very small capital cost. There are no running costs in quiet times, since all fire-watching and caretaking are included in that of the main building in which it lies. Daily dusting and cleaning parties only are required. In view of the destruction of civilian hospitals our experience may prove to be important; but I want to draw particular attention to another aspect. The basement during a blitz has a great appearance of safety; the noise of bombs and barrage is hardly audible and there is no flying glass. As a group, patients admitted to it recovered more rapidly from shock than did those who went to the parent hospital; and the strain on the staff was less and the work was more easily done. From an administrative point of view it was convenient to have only one class of case—air-raid casualties—to care for. In the parent hospital, when rapid evacuation of some wards was necessary, there was inevitable confusion and delay in the corridors where the staff tried to sort out by the light of a torch "the perforated gastric done yesterday" from "the abdominal from resuscitation wanted in the theatre." We have been so impressed by the value of the basement that, with the approval of

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the Ministry of Health, another has been prepared with the help of a brewery. The firm has gratuitously put at the disposal of the general hospital a large cellar (empty for the sad reason that there is no bottled beer to store in it) 30 ft. below ground, with an immensely strong building above it. Hot and cold water from artesian wells is laid on, and it is centrally heated; there is an air-conditioning plant and an automatic electrical pump to raise sewage from a sump. A theatre for 4 tables, an X-ray room and the other equipment will soon be ready. There will be accommodation for seventy beds and there is space for at least another thirty if necessary. This cellar will always be available; its main function will be to enable casualties from the densely populated area in which it lies to get effective treatment earlier and to avoid the strain of long ambulance journeys. The exact organisation of the staff has not yet been decided. This basement differs from the first in being always ready; it is not necessary to clear it before it can be used as a hospital. In addition to surgical teams and nurses to deal with casualties as occasion requires I would like to try the experiment of staffing it with general practitioners from the neighbourhood (it is about a mile from my hospital). It could then be used as a centre for the ordinary civilian nightwork of the district. I would like two general practitioners to be at the basement nightly whose duties would be to go out and visit local sick patients (their own or anybody else's) when called; to bring in and deal with emergencies of civilian practice; to go out with bearers, if necessary, to local incidents in air-raids; and to help in the work of the basement hospital when air-raid casualties are being treated there. The basement would thus serve as a centre for civilian medical service for the local sick, and would help to solve the difficulty of the shortage of doctors in the target areas.

WELFARE OF INDUSTRIAL WORKERS

IN May, 1940, the Home Office called an interdepartmental conference to consider the working hours and welfare of women and young persons in factories and raised the question of their welfare under war conditions outside the factories. During the last war outside welfare work was organised by the Ministry of Munitions, and it was suggested that this time the Ministry of Labour and National Service should coördinate the various activities which go to make up outside welfare. Shortly afterwards, as a war measure, the administration of the Factories Act was transferred from the Home Office to the Ministry of Labour. A new factory and welfare department was established in the ministry and the factory inspectorate was attached to it to continue its work for safety, health and welfare within the factories. In addition a new body of welfare officers was appointed to deal outside the factories with such matters as board and lodging, transport, day nurseries and the reception of transferred workers. The report of the Chief Inspector of Factories for 1940 [1] describes how these and other changes have affected factory conditions.

CANTEENS AND FOOD

The war of 1914–18 drew increased attention to the human side of industry. Preliminary work in this connexion was undertaken by the factory inspectorate and was afterwards developed on the advice of the Health of Munition Workers Committee. In the interval between the two wars factory conditions have improved under the influence of voluntary societies and also under the stimulus of legal orders. For example, the order requiring mess-rooms in certain trades has resulted in the establishment of canteens in some of the larger factories, and welfare orders have brought about improvements in first-aid, washing accommodation and seating arrangements. In many cases, though still a minority, the standard of these amenities was better than that legally required and the Chief Inspector's report pays a tribute to those employers who have thus gone farther than the law requires. By early in 1940 canteens had been established in 64% of those works engaged in munition-making which employed over 500 people. In parts of the south of England the figure was as high as 90%, but the percentage fell as one went north, where the canteen habit, for various reasons, had never been popular with the workers. To increase canteen facilities still further the Factories Canteens Order 1940 (No. 1993) was made, under which the occupier of any factory employing more than 250 people and doing work on behalf of the Crown must provide a canteen where hot meals can be bought. This was the first legal order requiring canteens in factories, although many previous orders had stipulated that mess-rooms should be provided. A mess-room is a place where meals brought in can be eaten and there is a supply of hot water and arrangements for heating food brought from home by the worker. In a canteen, on the other hand, meals are sold. It was clearly necessary to establish canteens in factories because rationing made it difficult to obtain portable food for a midday meal, and because (as Napoleon was aware) a man will work better if he is well fed. Other factors which called for increased feeding facilities were the extension of night work and the shift systems; the employment of A.R.P. and fire-watching staff; and the destruction by enemy action of the workers' houses and many public restaurants. Difficulties arose because materials were controlled and limited, but the Factory Department has had sympathetic help from the departments controlling supplies and no further difficulty is to be anticipated in the erection and equipment of essential canteens. Efforts to provide hot meals for workers in the smaller factories have not been so successful. The idea of providing joint canteens for a number of small factories met with little response from either the employers or the workers, and the possibility is now being considered of using the community feeding arrangements of the Ministry of Food and the local authorities. It is hoped that in many cases food will be sent from the communal centres to the mess-rooms of the smaller factories. The feeding of dock workers became a pressing problem and the Factory Department was given the job of solving the administrative details. The minister issued an order (No. 222 of 1941) under which the dock authorities can be required to provide canteens, and permanent ones are now being built to supplement the existing feeding arrangements. In the meantime excellent work has been done on the docks by the mobile canteens of the Women's Voluntary Service and other voluntary bodies, but the report points out that the voluntary organisations deal only with emergencies and are not to be used as an excuse for not providing permanent canteen facilities.

BUILDING SITES

It had never been the custom in peace-time to provide much in the way of amenities for workers on building and engineering construction sites, partly because the contractors would normally have ample time to consider their plans and partly because the British navvy was thought to be able to look after himself. But the great extension of the Government building of new munition factories, aerodromes and camps led to difficulties of labour, housing, feeding, sanitary accommodation and transport. The Ministry had to give earnest consideration to the conditions at the building camps, and the factory inspectors were given the duty of improving welfare conditions. At the same time the minister announced his intention of making an order under which better organisation on the sites could be legally required. The order (No. 66) was issued in January, 1941, and at about the same time a pamphlet [2] containing detailed recommendations to contractors was also published. In the early days of the war conditions were bad on many of these sites and on a few they were deplorable, mainly because the work had to be carried out at great speed but also because there was usually no-one on the contractors' staff whose duty it was to look after the workers. Contractors have been urged to appoint welfare officers, and where this has been done their services have been of great value. The latest reports show that conditions on building sites are rapidly improving.

1. Cmd. 6316. H.M. Stationery Office. 4*d*.

2. Factory Form 1892. Memorandum issued by the Ministry of Labour and National Service in connexion with the Building Operations and Works of Engineering Construction (Welfare and Provisions) Order, 1941.

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MEDICAL, NURSING AND WELFARE SUPERVISION

Previous reference has been made in these columns* to the order issued in July, 1940, by the Minister of Labour empowering the Chief Inspector of Factories to ask for the appointment of doctors, nurses and welfare supervisors in any factory doing work on behalf of the Crown. Dr. Bridge in his short report refers to the manifold difficulties of developing a comprehensive medical service in factories—for instance, the limited number of doctors available for and interested in the work, and the doubts which medical supervision of the worker raises in the minds of the workers, employers and the doctors themselves. Some have doubts whether a man should be asked to submit to medical examination by a doctor other than one of his own choice; others wonder whether any need exists for a medical service beyond that already provided under National Health Insurance. Nevertheless progress has been made and an increasing number of whole- or part-time medical officers continue to be appointed to factories. It has always been apparent, Dr. Bridge says, that unless the goodwill and coöperation of both employers and employees is forthcoming the work of a medical officer, whole-time or part-time, is unlikely to be of real value. Much still remains to be done, and it may be that in a few cases use will have to be made of the compulsory powers provided by the order. Fully trained nurses are entering industry in increasing numbers and special courses on the industrial aspects of nursing are being held by the Royal College of Nursing by arrangement with the ministry, which in some cases gives financial assistance to nurses selected for training.

PRAISE FROM THE ARGENTINE

THE Argentine Pro-Allies Commission has been distributing as a pamphlet the presidential address given to the Argentine Association of English Culture by Prof. Mariano Castex,[4] head of the department of clinical medicine in Buenos Aires University, who received an honorary M.D. Oxfd last year. Professor Castex took as his theme the debt of science and humanity to British medicine, and he gives a concise but perspicacious survey of the outstanding figures from Linacre to our living Nobel prizemen. It is inspiring to read this estimate of our national achievement by a representative of the great Spanish tradition writing from Buenos Aires, which is now, as Cajal points out, the real centre of that tradition. Professor Castex sees in the English spirit a creative originality based on a will to knowledge, and notes the singular flavour of modernity in Sydenham's work. He links the name of Harvey, in whom "every true doctor must rejoice," with those of Sir James Mackenzie and Sir Thomas Lewis; he connects the current interest in biophysics at Buenos Aires with the pioneer work of Stephen Hales. He attributes the rise of preventive medicine to eighteenth-century England, and sees in Jenner the triumphant vindicator of English methods and perseverance. He points out Britain's pre-eminent contributions in the last century to physiology, cardiology, tropical medicine and surgery. Castex praises the men as well as their work, quoting with warm approval Lister's precept: "Put yourself in the patient's place." Coming to our own day, he concludes that the twentieth century exceeds its predecessors in brilliance. "British scientists are endowed with a spirit of asceticism and high moral purpose, so that their outstanding achievements in practice and research have been made in an atmosphere of idealism, abnegation and humanity." He concludes that our successful union of tradition and progress makes British medicine worthy of the virtues which he attributes to us as a nation, a list too shy-making to repeat in plain English.

3. *Lancet*, 1940, 2, 233.
4. Castex, M. R. *Prensa méd. argent.* 1941, 28, no. 2.

WINCHESTER AND DISTRICT MILITARY MEDICAL SOCIETY.—A meeting of this society will be held at the Royal Victoria Hospital, Netley, on Monday, Oct. 27, at 3 P.M., when Surgeon Lieut.-Commander John Bunyan, L.D.S., will give an address on the treatment of burns and wounds by the envelope method.

In England Now

A Running Commentary by Peripatetic Correspondents

As I follow my molluscan life, mow the lawn or sit in surgeries, I often think what tales they'll have to tell, those lads from whom our thoughts are rarely absent—tales of Tobruk, epics from Crete and the Epirus, sagas of the skies. Then I'm not so sure. I remember going several times to an Armistice Day tea in an English village given by the local lady, Lady Pouncey. It was an excellent meal and the Hodges threw out from time to time cheerful remarks of chaff or crops or cricket—all current affairs. Then Lady Pouncey would sail along with cakes or sandwiches. "Talking of the good old times, boys? That's right. Those were the days." She was right, they were for her. Her husband had been made a knight for doing something to munitions and she had had ample scope for her bossy benevolence. As she passed along with her cakes and cheery remarks an awful silence fell on those wooden benches. Those memories had been packed up and she was tearing the brown paper off the parcel. "Dear Liz, don't let the children forget me. We're orlrite so far. Kiss baby. We move up tomorrow." The captions were simple enough, but a wise censor had suppressed the vivid and squalid film. Yes, great tales will be told, but probably second-hand by some house-loving Homer, who'll catch the glamour but not the lice, feel the thrill without the fear, supply sustained suspense in many chapters, ignorant of its raw material, the twisting of souls, the carking awl of tedium, the crude smell of butchered men. They'll probably give the book as a school prize—"An absolute classic, my dear boy."

* * *

When our phlebotomy team is invited to visit the manor house we are nearly always assured of willing subjects. Sometimes we are billed as being "at home" to volunteers. "Bleeding 7.30–10 P.M. Refreshments in the gun-room afterwards." However, in a small rural community one has to be sure that those who attend are genuine volunteers. It may be very difficult to refuse a pressing invitation from the vicar's wife to take part in the Upper Woople and Lesser Slugsbury Combined Blood-transfusion Drive, and the number of press-ganged victims may be quite noticeable. A brief analysis of the facies of the local organiser will usually give the clue as to what to expect. Once we were received in a lovely old house situated on top of a hill overlooking a valley. Our hostess was elderly and too frail for her blood to be of service to us. She had therefore begged that she might entertain the local donors and help the doctors and nurses. In the drawing-room only one couch was available for our use, early Victorian in design, Spartan in its discomfort, and very low on the ground; phlebotomy was slow going and backbreaking. The dining-room was set aside for coffee and home-made oatcakes. As we knelt down to insert the needle a Rockingham unicorn grinned down on us from a tallboy, and as the list progressed and the twilight of an early spring evening advanced candles were lit and held near us by the frail old lady. As the evening wore on the unicorn's gaze seemed to become less fixed and he, like us, betrayed ingravescent somnolence. The night was pitchblack and stormy as we carried away our crates of blood to the car by the aid of our hostess's hurricane lamp. Within four days a neighbouring town suffered a severe raid, and we were glad the blood was there.

Bleeding on the lawn is a recent innovation with us. We discussed the pros and cons around the tea-table and decided that the dangers of chill, sunstroke and spore-bearing organisms were outweighed by the bactericidal advantages of sunlight, and the heartening effects of fresh air and the song of the skylark. The skylark did in fact prove most helpful, and when he went off duty a small brown owl elected to take his place and see the list through. An unforeseen complication was a hæmatoma at the site of venepuncture, due to an aggressive horsefly who alighted maliciously on the dorsum of the hand steadying the needle. But there is undoubtedly much to be said for bleeding out of doors, and we have yet to see a volunteer so bled turn faint.

The value of music in phlebotomy was later investigated at a barracks, as the logical development of the

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important part played by the skylark. Half the ward was set aside for bleeding operations, the rest being occupied by Service sick and convalescents. The Forces programme was on and we were able to compare the relative influence of "Salut d'Amour" and "The Washington Post." The rate of flow was distinctly *rubato* with the former, but it came along nicely with the latter, while the "Boston Two-Step" caused the bottles to fill at an almost alarming rate. The ideal tempo for a blut-motif is *allegro ma non troppo*, but the temperamentally difficult vein of the stout middle-aged blonde donor reacts well to *allegretto grazioso*. The thin, small, fussy and good-natured elderly housewife is quite at home with *vivace* and she will fill her bottle faster than any. But on no account should the hypertensive general be bled to *allegro con fuoco*, while anything in the nature of a *galop de concert* should be shunned, for this gentleman's time is strictly *lento*, or at the most *allegretto con poco rallentando*. One advantage of music-while-you-bleed is that it becomes wellnigh impossible for the donor to hear his blood pouring into the bottle, a sound usually not well tolerated. It saves the doctor from having to keep up a continuous conversation and from the monotony of reproducing parrot-wise, in answer to questions, certain elementary principles of immunology not normally comprehendable by the bleeding public (this is not a disrespectful remark).

Our donors at the barracks had all given up their off-duty time to make their donation. Moreover, practically all the convalescents, who had been nonchalantly eating boiled eggs during the proceedings (pre-June, 1941, you will note), offered themselves as volunteers. On several of our country excursions we have been assisted by rural district ambulance teams, who have supported their stretchers on kitchen or other (on one occasion they were Adam) chairs on the lawn. The able officer-in-charge, the well-waxed discipline of whose moustache was reflected in the alertness and efficiency of his team, sent his pretty stretcher-bearers to help us. Mary, a lithe, blonde milkmaid from a neighbouring farm, brought her three-legged stool with her and squatted down beside the donor holding the bottle in her lap. Early on in the transfusion campaign we had established a bond of sympathy with the dairyman, the provision of aluminium crates for transport being an important link. The advent of Mary and her little stool seemed to complete the analogy between the milk and the blood businesses, and we decided to anticipate trouble and institute a Blood Marketing Board for the fairer distribution of plasma in the various hospitals in the area. At one of our out-of-door parties we noticed a curious form of local gossip. On this occasion the blood, after collection, had been placed in the shade under a beech hedge. When the number of completed bottles had exceeded twenty we noticed the late comers and some who "didn't think they would this time but would like to be tested" filing past the bottles on all fours. "Mrs. S didn't give much, did she? I thought she hadn't it in her." "Oh and fancy, here's Mrs B's, her with all them rheumatics and who's no sooner out of one quinsey than she's into another; I'd never 'ave thought they'd have taken off her. They'll be taking Ted's next." "I wouldn't like to have some of this blood put into me."

* * *

The late Bishop Welldon, when Metropolitan of India, knew a man whose three professions conferred on him the title of "the reverend doctor colonel." Moreover, it is said that the matrons of some hospitals are today preferring to call themselves "lady superintendents." And who has forgotten Mr. Jack Warner's "bunger-up of rat-holes"? The first and the last tell what a man's job is; the second is an example of the petty pride which makes everyone love a title, be he peer, churchwarden or acting unpaid lance-corporal. Both in the primitive tribal society of darkest Africa and in the more backward society of blacked-out Europe men seek for a label that they may stand apart from their fellows and say, "Thank God I am not as others." And a very good thing it is. How drab would be life without a Deputy Chairman of Ways and Means, how dull without a Master of Foxhounds.

We are taught in medicine to treat the patient, not the disease, and our teachers beg us to have always before us the human relationship between patient and doctor—a relationship of privilege shared, perhaps, only by clergymen. To the patient his doctor is his own adviser in whom he places his trust. In this relationship there is no officialdom. The patient is an individual, so is his doctor. The average man, particularly of the poorer class, has a healthy distrust of anyone representing the "authorities." He expects his doctor to be *his* doctor and different from the man who reads the meter, the landlord's rent collector, or the clerk at the labour exchange, all of whom are officials. Now wherever the state takes a hand it brings its own jargon. In medicine it brings health officers, tuberculosis officers, medical officers grades I and II, group officers, sector officers, officers of all sorts. If only because of this unimaginative terminology, gone is that relationship between patient and doctor; it is replaced by that between citizen and official.

To be justified, a title must be well chosen and suitably affixed. Why cannot the state and municipal authorities have plain doctors, physicians and surgeons? The term "doctor" is honourable enough, having the authority of learning and the sanction of history, though presumably not the approval of the Ministry of Health or the Town Hall. "Physician" and "surgeon" mean what they say. It is no distinction for a house-man to be called a medical officer, even if he is grade A, like an unobtainable egg. Anyway, he will soon be in the only place where the term is justified—with the forces.

* * *

The sartorial habits of our students in their new rural surroundings are indeed striking. Flannel trousers and sports jackets have ascended the fashion scale at a phenomenal speed. In the prewar days (already being referred to affectionately as the "old days") these articles, while worn extensively in the preclinical period, were considered démodé in the clinical period, except possibly on Saturday mornings. Now they are the acme of fashion, while some of the outfits worn have to be seen to be believed. Shorts are extremely popular, sandals are considered rather smart, slippers are often worn if the day should be fine, shirts are as varied in hue as the dragon-flies which flourish in our neighbourhood, while ties have almost disappeared. The return of the blazer would warm the hearts of all good Edwardians. Corduroy trousers spring up like mushrooms overnight, and I am dreading the atmosphere of my laboratory in the coming winter when, with every door and window sealed in an attempt to maintain a reasonable temperature, the room is filled with a mob of corduroy-embellished-occupants fresh from a damp journey. I only trust that "stinks" may not become the medical students', as well as the schoolboys', synonym for my subject. Hats, of course, do not exist—a reform which has my complete support. Since I was evacuated I have never sported one, not even on my weekly visits to town. What the effect of clothes rationing on all this will be remains to be seen.

* * *

To me it is always sad to read, as I did not long ago, of a great circus closing down. Difficulties in blacking out the Big Top and in getting animal feeding stuffs were blamed. Musing disconsolately upon the far-reaching effects of war I was a little comforted to observe a notice hung in the front hall of my home which ran as follows:

A CIRCUS WILL BE HELD AT 3 A.M. ON WEDNESDAY ON THE PEICE OF GROUND IN FRONT OF THE SCULERY WINDOW. ADMISSION: CHILDREN A PENNY, GROWN-UPS TWOPENCE, PERSONS UNDER 5 FREE. THE MAJORITY OF THE MONEY WILL BE SENT TO THE HOSPITAL. ANYONE CAN COME.

There were six performers, four human and the others nearly so, if I may say as much without giving offence to the patient pony and elderly neuter goat who had a good deal to put up with and coöperated in the most friendly fashion. There were seven turns in all, and, good as the acrobats and trapeze artists were, I personally liked best the pogo horse whose brown legs contrasted strikingly with his greenish tinted back curiously reminiscent of a groundsheet. I also enjoyed the undressing tramp and the clowns and their tricks with animals. As to what is to happen to the minority of the money contributed by a large and enthusiastic audience I have not yet dared to inquire. The minority question has given trouble enough in the past few years.

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Parliament

Civil Defence Progress

IN the House of Lords on Oct. 15 the Bishop of WINCHESTER asked the Government what steps had been taken against the coming winter to improve our air-raid shelters, to give immediate help to the homeless and to provide accommodation for the aged and infirm in bombed areas. Lord SNELL, who replied, agreed that it was the responsibility of the Government to meet the people's heroism with foresight and preparation and it would be foolish to say that everything was satisfactory, but it was some comfort that about 20 million people could now be sheltered. The aim of the Government was to provide shelters at or near their homes for all with an income of less than about £350 a year. Some 555,000 Morrison table shelters had been allocated in vulnerable areas and 20,000 additional tables were being made each week. Deep shelters were being developed through the London tube system, and last June a pamphlet was issued laying down standards of sanitation, heating, lighting, ventilation, bunking and cleansing control and supervision based on the recommendations of Lord Horder's committee, and on London's practical experience of last winter. Further recommendations about amenities in shelters by the Horder committee had been dealt with by a new Defence Regulation giving powers to the regional commissioner to undertake such matters as undesirable people in shelters and verminous bedding. In England and Wales, Lord Snell continued, 11,500 first-line rest centres had been established with accommodation for over a million people. There was accommodation for a further million in second-line centres. By July of this year 2167 shelters in London had been supplied with canteens, at which 100,000 people were served with food. Mobile canteens were used wherever possible. The Ministry of Food, through the local authorities, had emergency stocks of food in the different localities. The Government realised the need for tackling the question of providing safety for the aged and infirm. They present a very human problem, but natural reluctance to go and live among strange people often conflicted with the needs of the nation.

Service Dependants

In the debate on Oct. 16 on the new scheme for allowances to service men's dependants members made it clear that what the Government described as a White Paper was more like an ungenerous tangle of red tape, and not even Sir WALTER WOMERSLEY'S sympathetic exposition could reconcile the House to it. Indeed it was felt that the Service departments had left him with a large and unhealthy baby to hold, suffering—Mr. GALLACHER suggested—from malnutrition. The most important change in the new system is that a minimum standard for maintenance, after providing for rent and other commitments, has now been fixed. For an adult the figure is 16*s*., and two children under school-leaving age count as one unit. The maximum grant that can be made has been raised from £2 to £3.

Where there was sickness in a Service man's family an allowance up to £10 will be made, and if this does not cover the position Sir Walter said that he would ask for authority to give more. Amounts of £2 and below will not be taken into account. Where there is a death in the family a payment of £7 10*s*. will be made. The present cost of war service grants is about £5,500,000 per annum, and it is estimated that the new concessions will cost another £6,000,000, while extra publicity will probably result in extra claims which might be expected to amount to some £2,000,000, making a total of £13,500,000.

The Treasury had vetoed the possibility of a flat rate on grounds of expense, but the House was riled that these concessions should still be based on what Mr. DOBBIE described as the mean contemptuous means tests, and Dr. HADEN GUEST voiced a general fear that in practice the scheme was likely to prove neither efficient nor economical. The House agreed that adequate pay and allowances would spare both personal feelings and the labour and paper involved in sifting innumerable claims.

Supplies of liquid milk are made available for operational R.A.F. crews when recommended by station medical officers. (Sir ARCHIBALD SINCLAIR replying to Sir ROBERT GOWER.)

QUESTION TIME

Nurses' Salaries

Replying to Miss M. LLOYD GEORGE, the MINISTER OF HEALTH stated that he had appointed Lord Rushcliffe as chairman of the committee which he had formed to draw up, as soon as possible, agreed scales of salaries and emoluments for state-registered nurses employed in England and Wales in hospitals and in the public-health services, including the service of district nursing, and for student nurses in hospitals approved as training schools by the General Nursing Council. The committee will consist of two panels, one representing employers and the other representing employees, of equal numbers. Mr. Brown said he hoped to announce the names of the committee in about a fortnight. Miss I. WARD: Will the committee have powers to make recommendations with regard to nurses employed in industry.—Mr. BROWN: No. It would not, in my view, be appropriate to refer to this committee the salaries of this class of nurse.

Mr. T. JOHNSTON also announced that he is setting up a similar committee for Scotland under the chairmanship of Lord Craigmyle.

Alien Doctors

Sir HENRY MORRIS-JONES asked the Minister how many friendly alien doctors were now employed in their own work in our war effort, giving the different spheres of employment; whether any were in our services; whether any further avenue of war service was being offered to them; and how many alien doctors of all nationalities, except the United States of America, were still available.—Mr. BROWN replied: The number of alien doctors registered under the Medical Register (Temporary Registration) Orders, 1941, by virtue of employment in approved services is 470, apart from American doctors who have been dealt with under the order of 1940. Of the total of 470, 385 are employed in hospitals, 33 in public-health appointments, and 52 as ships' surgeons or in other miscellaneous posts. In addition 24 have received commissions in our Services, apart from those serving in Allied Forces. The order made on Sept. 23 last provides an avenue of service in general practice by enabling alien doctors to be registered by virtue of employment as assistants to doctors already on the permanent Medical Register. The number of doctors still available is approximately 500, including those who have only recently become eligible for registration under the amended Defence Regulation 32 B.

Treatment for Soldiers' Families

In answer to Major HADEN GUEST, Captain H. D. R. MARGESSON said that the extension to the families of soldiers enlisted since the war of the facilities for medical and dental treatment at present enjoyed by the families of pre-war regular soldiers or reservists now serving would involve an enormous increase in the numbers of Army medical and dental officers which could only be effected at the expense of the civil medical services. Moreover, the families of pre-war regular soldiers are not eligible for medical attendance in their homes unless they live within a mile of certain fixed points, and, if the concession were extended to the families of war-time soldiers, its value would therefore vary according to the family's domicile.

Grass as a Source of Protein

Dr. SUMMERSKILL asked the parliamentary secretary to the Ministry of Food whether he proposed to use grass as a source of protein.—Major LLOYD GEORGE replied: Research work on the production of edible protein from young grass is proceeding. There are however considerable technical difficulties to be overcome before any large-scale production can be contemplated. A sort of greyish material looking like cheese had been discovered, but only on an experimental scale.

War-time Nurseries

In reply to a question Mr. BROWN said that 156 maternity and child-welfare authorities have submitted plans for war-time nurseries; 221 nurseries have now been approved. Of these 163 were in operation at the end of September. It is not possible to say the exact number of children in attendance at these nurseries but the nurseries approved provide places for about 4250 children.

Hygiene in Air-raid Shelters

In answer to a question Mr. BROWN said substantial improvements have been made in dormitory air-raid shelters throughout the country. Progress is continuing but shortage

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of materials and labour has unfortunately prevented complete provision to the standards I have laid down. Canteens are available in over 2000 shelters in the London region. Schemes have been agreed with 90 local authorities in provincial vulnerable areas and many canteens have already been provided. In the London region 257 medical-aid posts have been set up, and over 100 in the provinces. Plans have been made for setting up further posts should the dormitory shelter population increase.

Increase of Tuberculosis

Mr. F. MESSER asked the Minister of Health what had been the percentage increase in pulmonary tuberculosis during the war; in what age-groups the increase was most marked; and if it was proposed to take any special steps to deal with this problem.—Mr. BROWN replied: On the basis of provisional mortality figures for the years 1939 and 1940, the rate in England and Wales for the population as a whole was 9·7% higher than in 1939, the highest rate being 15% among women between the ages of 15 and 25. In the first quarter of 1941 there was, however, a reduction of 7% for the population as a whole, and of 4% for women between the ages of 15 and 25. With the coöperation of the Medical Research Council I have arranged for an expert investigation into the causes of increase. Everything possible is being done to maintain the tuberculosis service.

Milk Scheme in Scotland

The total number of beneficiaries under the National Milk Scheme for Scotland on Sept. 27 was 358,200. The total annual cost of the scheme in Scotland is estimated at £1,540,000, including an allowance for administrative expenses. (Major LLOYD GEORGE replying to Mr. R. BOOTHBY.)

Letters to the Editor

ANÆSTHETIST AND SURGEON

SIR,—The position of the anæsthetist in the scheme of things surgical has altered sensibly during the past few years. He is no longer to be regarded as a pure technician whose work begins and ends with the administration of the anæsthetic during the operation. Enthusiasts like Hewitt, Shipway, Boyle and Hewer gradually raised the standard of anæsthesia, until, with the introduction of a high-standard diploma in anæsthetics, it finally achieved the status of a specialty. The anæsthetist of today should actively embrace in his field of work problems of pre- and post-anæsthetic care that are complementary to those of the surgeon. The latter should feel, and it must be granted that many surgeons want to feel, that in the anæsthetist he has a pillar of support, and a colleague whose opinion he will seek and value.

The nature of the operation may be decided by the report of the anæsthetist on the patient's pre-anæsthetic condition, while after the operation he is ready with his experience in the administration and handling of gases, to help and advise with such things as oxygen therapy. In the theatre, without doubt, the surgeon must be the captain. But the anæsthetist is his chief engineer, supreme in his own sphere, whose reports are vital if the ship is to be brought safely to port. During the operation, the anæsthetist must make himself responsible, not only for the administration of the anæsthetic and the observation of the patient, but also for the administration of resuscitative measures like transfusion. This has been recently stressed by Jarman and Evans in a discussion of factors which make for safety in the operative treatment of carcinoma of the rectum (*Proc. R. Soc. Med.* 1941, 34, 711). They insist on the control of the blood-pressure being in the hands of the anæsthetist.

If however the anæsthetist is to take his place in the surgical team, he must be a clinician as well as an applied physiologist. Hospital authorities should realise the necessity for the anæsthetist having sufficient time away from the theatre so that, like his surgical colleagues, he can visit his patients both before and after the operation. All too often, anæsthetists, especially those in full-time service, spend all their working time in the operating theatre, a state of affairs due largely to the lack of junior assistants. Were more junior posts created, the harassed senior could spend more time in the wards—to the advantage of the patient, himself, and his specialty—and new recruits to a most important field of work would be given a chance to gain experience.

Dartford, Kent. W. W. MUSHIN.

MEDICAL ASPECTS OF BOXING

SIR,—I was very interested in your review of Dr. Jokl's book and the correspondence ensuing from his deductions. As a boxer with experience of over 52 contests, and the good fortune to win many titles in the ring, mostly by knock-outs, I would like to express my own view. My contact with boxers, both amateur and professional, has extended over 20 years, and I must honestly say that I have never come across the direct injuries or sequelæ described by Dr. Jokl. I realise, of course, that Dr. Jokl has made a wide-world study of this subject, and do not doubt that injuries such as he has described can occur if the contestants are unevenly matched, untrained, neglect to procure a medical examination before a contest, and above all are not under competent instructors or medical supervision. The only direct injuries I have encountered have been broken nasal septums, abrasions of the skin and cauliflower ears, while black eyes, loss of teeth and laceration of the eyebrows were very common. Sprains, especially of the ligaments of the hands, are numerous, but I have never seen a Bennett's fracture in either a professional or an amateur boxer. Fouls, such as kidney punches, wrestling, hitting below the belt, and so on, are well controlled by competent referees and therefore do not cause much injury. Concussion delivered by the closed glove or by the occiput hitting the ring is only momentary and I have never seen it leave any after effects, except in a few cases a brief headache. I have been knocked out myself and knocked down on many occasions with none of the results or sequelæ described by Dr. Jokl. Blows on the abdomen above the belt, or over the heart, do cause a momentary loss of consciousness, but the effects in a properly trained individual are negligible. I have never seen any harm accrue from body blows as approved by a referee, although I agree that loss of consciousness is due to inhibition of the heart for a few seconds.

The sequelæ that Dr. Jokl mentions may indeed occur when the fight has not been under proper control or medical supervision, and in those boxers who, against medical advice, allow themselves to be used as chopping blocks. Punch-drunkenness is a very rare condition, found in second-rate sparring partners. Some of these have a history of syphilitic disease which accentuates the symptoms. I have never seen punch-drunkenness in first-class amateur or professional boxers. Intracranial hæmorrhage due to direct injury by the glove is also very rare, and I have never seen any nervous lesion, such as peripheral or central paralysis, caused by a punch. Injuries to the superficial tissues of the eye can stop a boxing career, but that is all; they have no permanent effect. A deflected nasal septum which has not been treated may in later life lead to sinus infection, while injuries to the ligaments of the hand may cause arthritic changes. Boxers who have had a long boxing career and have not consulted a doctor may develop retinal hæmorrhage or even a detached retina, but these cases again are exceptional. Pulmonary tuberculosis is another sequel of boxing and one I would like to stress. I have seen many boxers in their prime and after the close of their careers become victims of galloping pulmonary tuberculosis. If only they had been screened in the early stages (or indeed in some cases in the later stages) much could have been done for them. I have noticed in some cases that the tuberculous infection was latent until exercise, the dust of the gym with its attendant grit, and perhaps the trauma of the gloves on the chest, have sent them into galloping tuberculosis. For this reason I have always advised boxers with a history of T.B. in their family or symptoms of bronchial trouble to be X rayed before participating in this sport, and have advocated training and sparring in the open away from a dusty gym.

From my experience and from Dr. Jokl's findings I think that given proper medical supervision, properly matched opponents, and control under competent referees and instructors, boxing would lose any stigma which is

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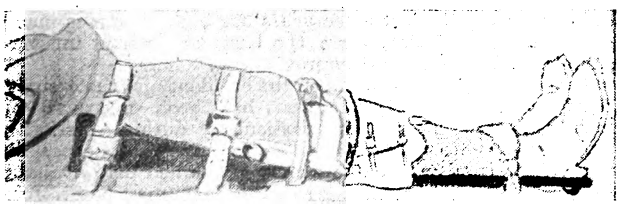
now attached to it, and much of the æsthetic antagonism which many people undoubtedly have against boxing would be mitigated. I cannot agree with Dr. Jokl that it is a game that should be barred from the physical education of the young men of the nation and armed forces. Fighting is man's natural heritage, and under the rules of true sportsmanship the noble art instead of bringing out the bad qualities brings out the good, teaching us to give and take, to stand on our own feet, to play the game, and above all to appreciate the ups and downs of our fellow men. Dr. Jokl has given us much food for thought, but he has painted only one side of the picture. I fancy that if he had given full weight to the safeguards which now exist (and which can easily be intensified in the Services if necessary) his strictures on the noble art would have been much less severe. I have fought some of his countrymen—good boxers they were too—and I feel sure that those of them who are medical men in South Africa will agree with me that

Boxing is a manly game,
'Tis Britain's recreation,
By boxing we shall raise our fame
Above every other nation.

Tunbridge Wells. E. F. ST. JOHN LYBURN.

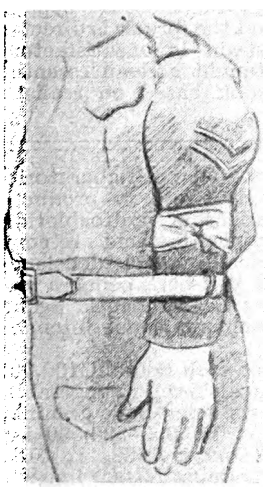
HOME GUARD PROBLEMS

SIR,—To what extent medical equipment should be issued to the Home Guard is a problem which affects rural areas more than urban ones, for the reasons already given by Mr. Lawrence Abel. In a rural area, such as his, medical equipment must be dispersed. But should we ask either the War Office or the Canadian Red Cross to supply our needs? The E.M.S. is now an established



Splinting of fractured femur, using sound leg, rifle, two belts, two field dressings, two anklets, handkerchief, and boot-laces tied together.

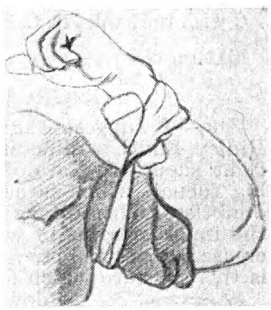
buttress of our social structure. It already shares with military hospitals the responsibility for giving institutional treatment to Home Guard as well as Service casualties. It has undertaken the task of decentralising hospital facilities, and it could therefore correlate the parochial problem of the Home Guard casualty scheme with its own. Costing the Government sixteen million pounds a year, the E.M.S. might reasonably be made responsible for the expenditure of the other half million pounds which Mr. Lawrence Abel assures us would be spent once only—to equip 50,000 posts. Lastly, the E.M.S. has a personnel of 1700 full-time doctors, colleagues whom harassed battalion M.O.s should find more approachable than the nebulous authors of incoherent "A.C.I.s."



Fracture at elbow.

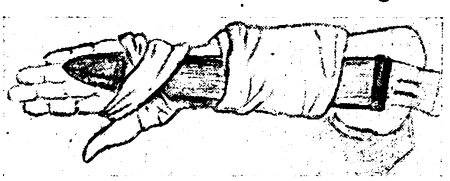
Compound fracture of humerus.

Most correspondents have been concerned with the inadequacies of medical equipment. As the M.O. of a well-dressed city battalion may I stress with diagrams the usefulness of the equipment which every volunteer carries on his person? His leather belt and anklets squeak when he is paratrapping, but they make excellent first-aid equipment when he is a casualty; as also do his rifle, bayonet-scabbard, boot-laces, haversack-straps and pocket handkerchief. If necessary, this equipment can be duplicated by the "pal" attending the casualty. In addition, Mr. Lawrence Abel says that each man should carry an 18 ft. by 3 in. roller bandage, and a thick piece of cord attached to his mackintosh-cape ground-sheet. As the official issue of the latter is one to four volunteers, and the actual issue considerably less than that, the second part of his suggestion is not universally applicable. Moreover, when it is remembered that the casualty and his pal between them carry 16 ft. of bandage attached to their first-field dressings, is the additional roller bandage necessary? My own fancy is for a triangular bandage. I have advised every volunteer to buy one and to carry it in a pocket of his haversack—and nowhere else. The most urgent use for it would be as a comparatively harmless tourniquet.



Hæmorrhage from forearm controlled by rolled sleeve and field dressing tied as figure of eight.

My own special problem has been the difficulties of instruction. Like the War Office itself, platoon commanders are not unnaturally obsessed with the importance of guns, and combatants are not encouraged to learn the implications of my motto *festina lenter*, and the gentle art of splinting fractures and minimising shock. In a city supplied with full-time A.R.P. first-aid parties, it is not easy to convince Home Guards that thorough knowledge of a little first-aid is the duty of every fighting man. A recent field exercise has indicated that demonstration of first-aid to a company en masse is a waste of time. In order to learn the "Woodford and Wanstead" method of blanketing, for example, men must themselves handle the stretcher and fold the blankets. They must practise it not once but several times. This can be done only by individual instruction and therefore cannot be attempted by the battalion M.O. Each company commander has therefore appointed a medical orderly whose combatant duties are nominal, and who has since been trained to teach the elementary first-aid and stretcher drill required. The medical orderlies have been given the rank of corporal and are responsible to the battalion M.O., with whom they constitute a committee which meets once a fortnight. In each company a rota for instruction has been arranged, so that each section (12 to 15 men) will in turn be taught by the company medical orderly on the weekly "platoon night." When practised in their "stretcher-bearer" duties, men are inspected in squads of four by the M.O., who tests their knowledge of the following syllabus:—



Splinting of fractured forearm, using bayonet scabbard, handkerchief and field dressing.

The control of bleeding and the dangers of a tourniquet. The handling of fractures, and the use which can be made of first field dressings and personal equipment. Carrying blankets in the closed stretcher. Blanketing of casualties and the importance of warmth. Stretcher drill and the importance of gentleness.

The proficient volunteers are given "S.B." brassards—and advised to conceal them. Company commanders

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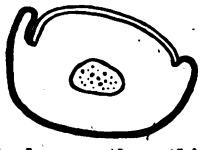
have encouraged efficiency by making first-aid a subject for inter-section competitions. By limiting first-aid equipment and the ambitions of enthusiasts it is hoped to diffuse throughout the battalion the little learning which is not a dangerous thing. It may even be life-saving if circumstances should make the unofficial assistance of A.R.P. parties unavailable.

I wish to thank Mr. C. Du Pontet for drawing the diagrams.

Oxford. H. C. HARLEY.

INGROWING TOENAIL

SIR,—I suggest the following explanations of Mr. Ridley Smith's difficulties in accepting the view that tight shoes are the only cause of this condition. The big toenail which is curved in the horizontal plane is doubtless an hereditary peculiarity. It is the tight shoes, the inner margins of which slope to a point, which increase the natural curvature of the nail by pressure. It is this pressure which folds the inner margin of the nail downwards. The outer margin of the nail is usually less affected. From the front the appearance is as shown (see figure). The frequency of the condition in young adults can be explained by the peculiar vanity of youth. They are prepared to suffer to be—as they think—beautiful. Though medical men see more cases in males, it is probable that chiropodists see more cases in females. I suggest that Mr. Radley Smith's case of bilateral double-sided ingrowing toenails in a youth after 14 months rest in bed can be explained by the absence of the normal upward pressure on the ball of the toe in walking. This would allow the toenail to assume an exaggerated downward curve. I presume that this man's toe and fingernails are of the curved variety.



Bridlington. P. D. H. CHAPMAN.

PLUMP TYPE OF GRAVES'S DISEASE

SIR,—May I add a word in support of Mr. Geoffrey Keynes regarding the impossibility of distinguishing the plump type of Graves's disease described by Dr. Trotter and Mr. Eden. Not all patients with Graves's disease lose weight and some are plump in spite of a raised metabolism, but the suggestion that this is especially apt to occur in young women with a particular combination of physical signs is largely hypothetical and might lead to serious misapprehension if taken for gospel, in view of the authors' claim regarding prognosis and treatment. A progressive decrease in body weight is, of course, one of the best indications that the patient with thyrotoxicosis is losing ground and usually indicates the need for thyroidectomy. Conversely gain in weight suggests that there is little immediate risk of physical exhaustion, but it can hardly be over-emphasised that when prognosis and treatment are under consideration such changes in body weight must be interpreted in relation to all the other clinical data available. In this assessment of the case skill and judgment are required no less than in thyroidectomy. In view of Mr. Keynes's final remark it seems worth stating that a high mortality is not a necessary accompaniment of a surgeon's early efforts at thyroidectomy.

Westminster Hospital. FRANCIS F. RUNDLE.

STUDENTS ADVISE THE PRIME MINISTER

SIR,—I received the following telegram at the House of Commons on Oct. 11 :—

> We are seriously disturbed at the present military situation in Russia and are alarmed at the absence of effective British intervention. We urge the Government to take immediate armed action to relieve the pressure on our Russian Allies, believing that the battle for Russia and the battle for Britain are inseparable.—63 U.C.H. STUDENTS.

I understand from notices in the press, which has given the incident wide publicity, that the same telegram was sent to the Prime Minister and to the Secretary of State for War. The signatories are, presumably, present or prospective constituents of mine, and I would like to thank them for the compliment they pay me in addressing me. The telegram is unsigned, so that a direct acknowledgment is difficult. The primary purpose of the telegram is obviously to exert pressure upon the Prime Minister to take action which seems desirable to the signatories, unacquainted as they must be with all the considerations that are weighing with the Prime Minister. May I suggest an analogy which will I think persuade the signatories that their intervention is ill-advised? Let us suppose that the operating-theatre of a great hospital school is filled with first-year medical students, assembled to watch the most famous surgeon of his generation perform an exceptionally critical abdominal operation. The surgeon on opening the abdomen finds conditions in which, his unique experience tells him, completion of his operation may have immediately fatal results. The surgeon pauses to reconsider the situation, and the students, unable to see what he sees, or to gauge its significance, shout at him: "For goodness' sake, man, *do something*, if only to relieve our unbearable suspense." The Prime Minister is in the position of this surgeon, and I submit that the decision for which he, and not his critics, is responsible should be left to his unfettered and consummate judgment.

House of Commons. E. GRAHAM-LITTLE.

"FIRST-AID TO THE INJURED"

Dr. JOHN C. HODGSON, battalion medical officer to the Kent Home Guard, has sent the following letter to the secretary of St. John Ambulance Association :—

SIR,—For the last fourteen years it has been my pleasure and privilege to lecture and to examine on behalf of your association. While I have always thought that your authorised textbook "First Aid to the Injured" is extremely satisfactory as a training manual in time of peace, my studied opinion during the last three years has been that it is inadequate in time of war, when the basis of first-aid must be simplicity, flexibility and improvisation.

In peace the interval between the accident and the casualty receiving professional attention has been measured in minutes; in war, and more particularly during a period of invasion, the interval may be one of days. This is especially true in the rural areas, where the only skilled help available for casualties, even for as long as ten days, may be St. John and Red Cross personnel, working in isolated houses without any surgical supplies, or in the casualty collecting posts of the Home Guard, and A.R.P. points and posts, with limited supplies of dressings.

I would therefore appeal to your association to consider whether a supplementary pamphlet on "First Aid in War-time" should not be considered an urgent and immediate necessity. My tentative suggestions would be that hæmorrhage, shock, wounds, fractures, pain and burns, and the evacuation and removal of casualties are the necessary subjects for reconsideration, with particular emphasis on the use and abuse of the tourniquet. The immediate reaction of the first-aid student to the treatment of bleeding should *not* be the tourniquet—it is not a foolproof weapon.

*** In a leading article in THE LANCET of Jan. 25, 1941, it was pointed out that the St. John and Red Cross textbooks were neither of them designed to meet the type of problem presented by air-raids and the former is directed to peace-time conditions. First-aid is unsatisfactory at present because it is badly taught and an essential support of teaching is a textbook based on realistic conditions.—ED. L.

TWO NEW GLAXO PRODUCTS.—Glaxo Laboratories have sent us particulars of their two new products. In NICORBIN tablets 1 mg. aneurine hydrochloride, 25 mg. ascorbic acid and 10 mg. nicotine acid are combined for treatment of subclinical multiple-deficiency states and for protection against beri-beri, pellagra and scurvy. Nicorbin is designed as a therapeutic agent, and except in gross undernourishment is not intended as a dietetic supplement.

High-potency OSTELIN capsules each contain 100,000 international units of vitamin D (calciferol) in vegetable-oil solution. This strength allows small-bulk administration of the massive doses (e.g. 150,000–600,000 i.u. daily) used in Stoss therapy (*Lancet*, 1938, 1, 618). High-potency Ostelin tablets containing 50,000 i.u. will continue to be available for the time being.

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Obituary

ROBERT BRIGGS WILD

M.D. LOND., M.SC. MANC., F.R.C.P.

THE death of Dr. Robert Wild, formerly Leech professor of materia medica and therapeutics, will bring back memories of old times and old friendship to generations of Manchester medical students. He was a charming examiner, and nervous students must often have been grateful to him for friendly encouragement and for keeping enthusiastic external examiners within bounds. In the last war he was a general favourite in the 2nd Western General Hospital, mixing well with the officers who were continually joining and leaving the staff and always willing to tackle any job that came his way.

Coming from Holcombe, near Bury, Wild joined the medical school in 1880 and from that time till his retirement in 1927 was connected with it in one way or another. After serving as house-physician and pathological registrar at the Royal Infirmary he worked in the department of pharmacology with D. J. Leech, and on his death succeeded him in the chair. He wrote many useful articles which illustrated his practical experience with drugs and he was specially interested in ointments and in drugs which deaden pain. The layman was grateful for his willingness to try out every remedy that had a reputed action for good on cancer. To both the Manchester and Salford Skin Hospital and the Christie (Cancer) Hospital he was a devoted servant. In the university he held, in addition to his professorship, the positions of pro-vice-chancellor and dean of the medical faculty. He also represented it on the General Medical Council for five years. On his retirement he presented to the university £250 for endowment of a prize in pharmacology and at the same time received from his old medical friends his portrait by Francis Dodd reproduced here; this he passed on to the medical school. Wild was a keen antiquarian, and he and his wife, who was a daughter of Colonel Hillkirk of Withington, gave to Chetham's Hospital an old street cross, Hyde's cross, which at one time stood in one of Manchester's busiest spots.

Lately Wild had lived in Buxton, where his wife, apparently in fair health, died suddenly seven days before his own death on Oct. 7. He was nearly 80. They had been married fifty-four years. They leave two daughters, the elder one a doctor who married Dr. E. R. Jagger of Burton-on-Trent.

OTFRID FOERSTER

IT will be a grief to many to learn that they will not meet Otfrid Foerster again. He was the best German general neurologist since Oppenheim, but he was more—he was the most important neurophysiologist that Germany has ever had and would have been regarded as a great acquisition by any university in the world. Educated at Kiel he went eventually to Breslau to serve under Wernicke. He was early interested in muscle tonus and this led him to his well-known work on rhizotomy. This work illustrated his power to extract the fullest number of facts from a single happening, for in addition to his studies on the resulting hypotonus he observed segmental flushing from stimulation of the spinal roots, and years later published the best documented paper on the extent of the spinal dermatomes that has appeared. For many years he was a spectator in surgical procedures, many of his early operations being done by Küttner. The war of 1914–18 brought him opportunities to operate himself, and some of his best physiological work also came out of it—his observations on peripheral nerve and spinal injuries. During the last 20 years he became more and more interested in brain mechanisms, in cortical stimulation, in the surgical treatment of epilepsy, and in intracranial tumours, operating himself. The book which exhibits his qualities at their best is that on the pain pathways. Recently in collaboration with Bumke he edited the great "Handbuch der Neurologie," to which he contributed several important sections, notably those on the motor and sensory cortex. The Rockefeller Foundation built for him in 1934 an institute for brain research in the Wenzel Hanke Hospital, where much of his work had been done.

All of Foerster's work showed a strong physiological bent; he was probably a better experimentalist than doctor. Patients were to him damaged units needing repair, but he preferred them to repay him by contributing to the knowledge of nervous mechanisms. He had good reason to demand it, for few clinicians have had more penetrating insight or chosen with greater acumen the methods that would best resolve a problem. The mark of a scientific mind is to see a problem, to estimate whether it is complex, and then to devise means of solving it. None of these is easy. Foerster had a gift for them all. A striking feature of all his work is the excellence of his illustrations, betokening his insight into requiredness as well as his artistry. He was an intensely interesting man, a good talker, with a memory highly retentive of difficult facts, and a kind and hospitable man who loved to have his pupils to his house once or twice a week, where they sat till late drinking his special brands of Rhine wine and pink champagne while he talked of everything—neurology, history, poetry, even politics. He had been selected by the German government to attend Lenin in 1920 (a fact that a later government thought discreditable) and found him an extremely interesting personality. Foerster had inherited from his father, who was professor of rhetoric in Breslau, considerable histrionic gifts and a love of literature, especially of Goethe, pages of whose poetry he knew by heart. He was an admirable speaker, and his sense of timing and of the fitness of certain words and gestures for special occasions made his public appearances always remarkable. His spare figure, his pale features, his carriage, all combined with his words to make his hearers realise they were in the presence of a great man. Those who knew him more intimately felt at once the emotional warmth which his keen scientific mind half obscured. They will deeply regret the ending of their friendship with a rare character, and a distinguished man.

G. J.

WILLIAM KERR RUSSELL

M.D. DURH.

Dr. Kerr Russell, who died on Oct. 4 in hospital at Oxford after a short illness, was the son of Dr. Frank Russell of Heaton, Newcastle-on-Tyne. He went to Quaker schools at Ackworth and York and then to the Durham school of medicine from which he graduated with first-class honours in 1914, being awarded the Goyder scholarship. After serving four years with the R.A.M.C. he had good surgical experience under Rutherford Morison in orthopædic work before entering general practice in an industrial district of Newcastle where he was joined by Eleanor Wylam, a fellow Durham graduate, whom he married in 1923. Their bent was towards physical methods and Russell founded the Sun Ray Clinic of which he was honorary director until he left Newcastle for London in 1928 to take up specialist practice in physical medicine. He was given charge of the light and electrical departments of the Miller Hospital and in 1934 became hon. physician to the National Temperance Hospital, where he reorganised the physiotherapy department. At Harrow where they lived he and his wife were joint hon. physiotherapists to the local hospital. He was at once shy and sincere, with that sort of enthusiasm for his job which makes for experiment and advance. His shyness may have been coupled with his slight deafness, but colleagues who came to know him well learned

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to value his good humour and his skilful collaboration in treatment, as well as his vitality and vision. At the Miller, where some 75,000 treatments were given in the year, he was co-director of the Almeric Paget school, lecturing to students of massage. This considerable clinical work did not prevent him from making a world-wide study of physical treatment, reflected in the *British Journal of Physical Medicine* of which he ultimately became editor, and in two popular books on ultra-violet radiation, one written in collaboration with his wife. In June, 1940, Russell left London to take over single-handed a country practice at Ross-on-Wye and after a strenuous twelve months there had the first premonition of the deep-seated glioma which so rapidly proved fatal. He was in his 51st year and is survived by his wife, a son and a daughter.

ALEXANDER GOODALL

M.D. EDIN., F.R.C.P.E.

Dr. Alexander Goodall, senior physician to the Royal Infirmary, and past president of the Royal College of Physicians of Edinburgh, died at his home on Oct. 7. Dr. Goodall, who was a son of the manse, was born at Barr in Ayrshire in 1876, and educated at George Watson's and at Edinburgh University where he graduated M.B. in 1898 and M.D. with high commendation in 1901. He became an assistant physician to the Royal Infirmary in 1913 and physician in 1928 on the retiral of G. L. Gulland, with whom he collaborated in his book on "The Blood." In his early days Goodall worked with Noël Paton and from 1906 till his death he was lecturer in physiology in the School of Medicine of the Royal Colleges. He had been elected to the fellowship of the Royal College of Physicians of Edinburgh in 1904, and from 1937 to 1940 he was their president. For many years he was one of the busiest consultants in Edinburgh, and he maintained his close interest in hæmatology on which he continued to give postgraduate lectures after he had retired from his lectureship on clinical medicine at the university. During the last war Goodall served in the R.A.M.C. as major in charge of a medical division at Salonika, and he often spoke of the value of this clinical experience. Dr. Goodall is survived by his widow, two sons, and three daughters.

Swan Watson, Edinburgh

Dr. Fergus Hewat, who shared with Dr. Goodall for seven years a ward in the Infirmary, writes: Goodall was a shy man and disliked medical committee work where discussions are apt to be prolonged and tedious, and he was happier teaching and looking after his patients. He loved his home and his children, and for some years was proud to be the only grandfather on the staff of the Royal Infirmary. He found time for shooting, and on his day he was an excellent shot. He loved the country and all its associations. He always tried to see the humorous side of a situation, and this outlook at times led him to be misunderstood by those who were more formal in their demeanour, but the big occasion made no appeal to him.

JAMES RUSSELL McWHIRTER

M.B. BELF.; ACTING SQUADRON LEADER R.A.F.

Dr. McWhirter was born in 1909 and educated in Belfast, where he qualified in 1934. After holding house-appointments at the Royal Infirmary, Bristol, St. Luke's Hospital, Chelsea, and Archway Hospital, Highgate, he was appointed to a short-service commission in the Royal Air Force in 1937. During the next two years he served at various flying training schools and qualified as a pilot in 1939. Early in 1940 he was posted to Middle East Command, and shortly afterwards he was transferred to the reserve on completion of his initial service on the active list. He remained employed as a reserve officer, and he was serving in the Coral Zone when he was killed in a motor accident on Aug. 31.

NAVAL HONOUR.—The D.S.C. has been awarded to Surgeon Lieutenant E. A. Penn, M.R.C.S., R.N., H.M.S. *Ladybird*, for courage and coolness when his ship was sunk by enemy aircraft.

Public Health

From the School Reports

CUMBERLAND

Dr. Kenneth Fraser in his school report for 1940 says that the evacuees were better nourished, especially the school-leavers, but less clean than the natives. The children of the second large evacuation in midsummer 1940 were less unclean than those of the first evacuation in 1939 and gave little difficulty in billeting. Of the native children 5% were ill nourished in infants, 7% in intermediates, and 5% in leavers. Amongst the evacuees the percentages were 3, 3 and 1. Whatever may be the value of the standard adopted it was uniform, so the two sets are comparable. There may have been some selection in the evacuees; or it may be that the difference is partly racial—e.g., that the evacuated children who come from the cities develop more quickly than the country folk—and it is not possible, especially in the leavers, to distinguish malnutrition from the irregular growth which occurs about puberty. But there has always been something to explain about the nutrition of the children of Cumberland. The cleanliness of the 1940 evacuees compared with those of 1939 is explained by "the commotion incidental to the outbreak of war on the one hand and the prepared evacuation of 1940." Owing to the widespread reservoir of the head louse, the heads of school-children can be kept free from vermin only by constant action. In the upset at the start of the war supervision was much more faulty in the evacuating than in the receiving areas and this accounts in part for the high infestation of children on reception.

LEICESTERSHIRE

Dr. J. A. Fairer tells us that in the routine inspection of 12,303 children during 1930 441 were referred for treatment for tonsils alone, 118 for adenoids alone and 361 for both tonsils and adenoids. This incidence is low. The percentage of children referred for tonsillectomy has varied enormously in different places and at different times, but that referred for adenoids has declined steadily. The fluctuations of tonsil cases may vary with fashion or individual opinion, but the incidence of adenoids, in which fashion has played no part and opinion is less divided, must reflect a true decline of the adenoid syndrome which has been obvious in recent years. Indeed the running nose, both a cause and a symptom of adenoids, is now seldom seen. This is probably due to improved nutrition and is one explanation of the few droplet infections in circumstances otherwise favourable to a high incidence. Among the inspected children only two cases of crippling rickets were detected.

Infectious Disease in England and Wales

WEEK ENDED OCT. 11

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1336; whooping-cough, 1970; diphtheria, 1034; paratyphoid, 64; typhoid, 23; measles (excluding rubella), 787; pneumonia (primary or influenzal), 705; puerperal pyrexia, 145; cerebrospinal fever, 110; poliomyelitis, 38; polio-encephalitis, 4; encephalitis lethargica, 2; dysentery, 207; ophthalmia neonatorum, 89. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 8 was 1304; including scarlet fever, 160; diphtheria, 270; measles, 23; whooping-cough, 524; enteritis, 27; chicken-pox, 17; erysipelas, 29; mumps, 11; poliomyelitis, 7; dysentery, 16; cerebrospinal fever, 17; puerperal sepsis, 12; enteric fevers, 48; malaria, 1; other diseases (non-infectious) 45; not yet diagnosed, 97.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fever, 3 (0) from measles, 9 (3) from whooping-cough, 34 (0) from diphtheria, 42 (3) from diarrhœa and enteritis under 2 years, and 11 (0) from influenza. The figures in parentheses are those for London itself.

Preston reported a fatal case of enteric fever. There were 3 deaths from diphtheria at Birmingham. In the same week Dublin had 30 deaths from diarrhœa.

The number of stillbirths notified during the week was 207 (corresponding to a rate of 39 per thousand total births), including 11 in London.

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Notes, Comments and Abstracts

HEALTH EDUCATION BY PROPAGANDA

GEOFFREY BARBER, M.B. CAMB.

THE announcement by the Chief Medical Officer of a nation-wide campaign against the common cold comes as a spur to those who have already been planning an even wider campaign against all diseases which can either be prevented or lessened by fairly simple measures. The success of the Ministry of Food in teaching the public about economy in the kitchen, and the essentials of healthy feeding, through what is called the Food Front, has prompted the question whether a similar Health Front might not be equally successful. The same methods could be employed—posters to draw attention to advertisements in the press, and a daily short broadcast at a popular time. All three would be used in strict collaboration, being planned by one source to advertise and fit in with the other two. The posters and the press would use slogans and cartoons, such as "Don't belong to the sixth column of disease" and the services of Fougasse for cartoons of the German leaders in various unhealthy rôles could be relied on to fix the popular imagination where it is wanted.

Broadcasting on health is at present limited to a short talk on Fridays at 10.45 A.M., and this is not enough, besides being at a time when few can listen. Indeed, it is shown to have only 6% of listeners. These talks are independent of the few sporadic press articles and advertisements which do appear from time to time, whereas a short daily talk at a popular time, advertised in the press and led up to by cartoons, could do powerful work. The talks would have to be very carefully planned, and there are many errors and pitfalls to be avoided. It is difficult to talk on medical subjects and keep one's language simple and free from technicality, and the speakers would have to arrange not to contend with or contradict each other. Above all, the talks would have to avoid suggestions which might encourage the hypochondriac and fusser. The subjects of the short broadcasts might be as follows:

The scope of medicine; preventive and curative.

Diseases which are definitely preventable—smallpox, typhoid, diphtheria, tetanus.

Diseases which *may* be prevented—bovine tuberculosis, whooping-cough, impetigo.

Those which may be lessened, chiefly because they are carried by droplet infection or by dust—tuberculosis, tonsillitis, scarlet fever, influenza, colds and coughs.

The natural history of the house fly and its bearing on some illnesses.

The influence of crowds; sneezing and coughing in public as a form of sabotage. Cinemas and tubes.

What the public has a right to expect of medicine; from general practitioners, clinics, specialists and hospitals, and how to help them to help the public. (There is a good opportunity here to mould opinion towards necessary reforms.)

The home medicine chest, and simple first-aid to minor cuts, burns and sprains. What a disinfectant aims at, when to use it, and when to leave well alone.

During illness; nursing, prevention of spread of infection.

Popular fallacies; hypochondriacs and pessimists.

A further series of subjects could be drawn from Shakespeare's seven ages of man. The mewling infant from before birth, through feeding (natural and artificial), as far as teething. (The kitchen front has already given model talks on this, and Dr. Charles Hill might well be brought back to the health front to continue right through.) There follows the schoolchild—bow legs and knock-knees, rickets, teeth—on to adolescence and puberty. The difficult child, and the parents share, would be very helpful to some, particularly in small families. Infectious fevers, and common sense in nursing them, would help parents and doctors alike. Premarriage and the wild-oats stage would need cautious handling for the more prudish listeners, but if the talks did away with the present ostrich-like attitude of many parents they would prevent much hidden mental worry and suffering; venereal disease will not grow less until it is treated in a more matter of fact way. The need of recreation for the worker, both the wage-earner and the housewife, would help the family doctor as well as the workers themselves, merely by reiterating the advice which we have to give so often; and the same applies to the many problems of middle age, obesity, rheumatism, D.A.H., septic teeth, and "40–50." Finally a sane word or two might be said on the stages of "slowing down," and "packing up," to try to instil a reasonable attitude to death and comfort the cancerphobe.

Facility in broadcasting does not always go hand in hand with the best knowledge on a subject, and it would be wise to coördinate the efforts of all the speakers by making them prepare their talks in the same way, so as to ensure an easy style. The following routine has something to commend it. First write down all your ideas on the subject; classify and arrange them and make them into a short continuous essay. Then make a precis of your essay, with headings and notes, and finally use this as a basis for a conversational talk to your shorthand typist. This method will often produce a fluent and unstilted talk from a man who thinks more easily than he speaks.

MILK FOR INVALIDS

THE arrangements for the supply of fresh milk on a priority basis to certain classes of invalids have now been completed. Lord Horder, as medical adviser to the Minister of Food, has sent a personal letter to each registered medical practitioner enclosing a confidential statement regarding the issue of medical certificates for the supply of milk on a priority basis under the milk supply scheme. These two documents explain the reasons for the special arrangements and detail the conditions and procedure governing the issue of certificates for liquid milk to people suffering from any of the prescribed medical conditions. Under the arrangements as finally agreed, the doctor will insert on the certificate the class number and letter of the medical condition according to the schedule in the confidential statement; otherwise no diagnosis appears on the certificate. In this form the certificate will fully preserve the confidential relationship of patient and doctor. The certificate passes direct to the local food office, which issues the necessary documents to permit the supply and purchase of the prescribed quantity of milk for the period authorised. These arrangements impose on members of the medical profession sole responsibility for the issue of medical certificates for milk in accordance with the Milk (Scheme of Supply) Order. The conditions qualifying for priority cover a wide range, and Lord Horder urges that a certificate should only be given where genuinely necessary. "If the maximum allowance is prescribed in every case of illness," he says, "the total consumed in this way may seriously curtail the supply of milk available for able-bodied adults, and even prejudice the quantities needed by mothers, children and adolescents."

CHILDBIRTH IN DUBLIN

THE reports[1] of the Dublin maternity hospitals (the Rotunda, Coombe Lying-In, and National Maternity) for 1940 cover records of over 11,000 patients. The cases are tabulated without the familiar division into booked and unbooked, which is usually made to show the benefit of antenatal care. Certainly the cases "from the country" include the bulk of those in poor condition, bad subjects for necessary operative interference. At the Rotunda, 80% of the patients made antenatal visits and Coombe Hospital reports 2·6 visits per patient. Delivery was per vaginam in 10 Rotunda patients who had previously had cæsarean section; 2 of the babies died; 4 similar cases were successful at the Coombe. That there is a danger of rupture of the scar is shown by the record of a case treated by hysterotomy for hyperemesis; she had mild albuminuria in a subsequent pregnancy and was given three doses of pituitrin, 0·25 c.cm., with resultant rupture treated by immediate cæsarean and repair. One case of ruptured scar at the Coombe Hospital was treated by cæsarean hysterectomy. In another case a premeditated repeat cæsarean revealed a scar deficient for 1½ in., covered only by peritoneum, which had remained intact in the absence of labour pains.

Local anæsthesia is used for some cases of cæsarean section; 4 of the 63 operations at the Rotunda were by this method, and 8 of the 41 at the Coombe. Upper

1. *Irish J. med. Sci.* August, 1941, p. 273.

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and lower segment operations were performed in the ratio of 14 to 49 at the Rotunda, 16 to 25 at the Coombe, and 3 to 34 at the National Maternity. Cæsarean hysterectomy was twice considered necessary at the Coombe—for ruptured scar, and toxic accidental hæmorrhage. After 3 of the 63 cæsareans at the Rotunda "burst abdomen" followed on within 7–10 days, one case proving fatal. The 3 patients were suffering from concealed accidental hæmorrhage, hæmatoma of the rectus sheath, and pre-eclampsia. At the Rotunda, 2 successful cases of pubiotomy are recorded. In both the pelvis was contracted, and the operation was performed to facilitate delivery with Kielland's forceps, the operator having been unsuccessful without it. The patients were discharged, walking, on the 10th and 16th days, and both infants survived.

Cases classed as eclampsism in the Rotunda report seem to include chronic nephritis. The group consists of 7 multiparæ and 3 primigravidæ; 4 of the 10 cases had a blood-pressure of over 200 mm. Hg with albuminuric retinitis, and were less than 30 weeks' pregnant. The eclampsia group, on the other hand, contained 9 primigravidæ and 2 multiparæ, only one case being less than 37 weeks pregnant. In the treatment of eclampsia the Coombe Hospital uses lumbar puncture, and the intravenous injection of 50% glucose, while the National Maternity uses magnesium sulphate injections; details of the methods are not given. The three hospitals treated 42 cases with 2 deaths. Flourishing gynæcological and pædiatric clinics are attached to the hospitals, and are an asset for teaching purposes. In following up mothers and babies the student sees just the kind of case he will have to deal with in practice. Of the hysterectomies performed, 50% at the Rotunda were by the vaginal route, but only 1 in 30 at the Coombe, and 9 in 59 at the National Maternity.

C.S.M.M.G. SALARIES.—In a recent issue (Oct. 11, p. 441) it was stated, on the authority of the secretary of the Chartered Society, that the new scale of salaries recommended by the council for members of the society working in E.M.S. hospitals had been approved by the Ministry of Health. We understand that this approval has not gone beyond the readiness of the Ministry (set out in E.M.S. Gen. 330) to reimburse these hospitals for the usual proportion of the work done there by auxiliary medical services.

Medical News

University of Cambridge

On Oct. 17 the following degrees were conferred by proxy:—

M.B., B.Chir.—J. S. Johnstone, D. E. Marmion, D. S. Cadman, J. M. Stansfeld, Rees Jenkins, I. G. Wickes, R. C. Southern, and *O. L. Scarborough.

M.B.—J. R. Griffith and W. S. Nutt.

* In person.

University of Wales

Dr. D. T. Thomas has passed the examination for part II of the D.P.H.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Oct. 15, with Dr. H. M. Traquair, the president, in the chair, the following were admitted to the fellowship:—

W. V. Beach, M.R.C.S., D. W. Bracey, M.B. Lpool, M. S. Campbell, M.B. Lond., Iqbal Chand, M.B. Punjab, C. D. Coode, B.M. Oxfd, H. K. Dastur, M.R.C.S., Hiren De, M.R.C.S., J. C. Dick, L.R.C.P.E., H. L. Duncan, M.B. Edin., M. G. el-Din, M.B. Cairo, Thomas Gibson, M.B. Glasg., W. H. Kirkaldy-Willis, M.B. Camb., M. A. M. Labib, M.B. Cairo, H. A. McDonald, M.R.C.S., W. C. McGuire, M.D. Ontario, George MacKay, M.D. Manitoba, J. W. Morgenthal, M.B. Edin. and J. M. H. Ross, M.B. Edin.

The following office-bearers were elected for the ensuing year: president, Mr. J. W. Struthers; vice-president, Dr. H. M. Traquair; secretary and treasurer, Mr. K. Paterson Brown; members of president's council, Mr. James M. Graham, Prof. R. W. Johnstone, Sir John Fraser, Mr. A. Pirie Watson, Dr. G. Ewart Martin and Mr. Francis E. Jardine; representative on the G.M.C., Mr. Alexander Miles; convener of museum committee, Mr. W. Quarry Wood; and librarian, Dr. Douglas Guthrie.

CORRIGENDA.—For M.D. Edin. read M.B. Edin. in the title to Mr. Winsbury-White's article (Sept. 20, p. 331).—On p. 453 (Oct. 18), fourth line from the end, read *saline* for *normal saline*.

Radiology under Social Security

A New Zealand correspondent writes: In August diagnostic services in the X-ray departments of public hospitals were made free to all, as therapeutic services had already been made. This cleared up the anomaly that existed since hospital benefits were introduced, namely that it cost a patient say two guineas as an outpatient of a public hospital to have his chest or stomach X-rayed, whereas if he got himself admitted as an inpatient for a few days the whole cost him nothing. The expected flood of work has not fully materialised though it is quite clear that the volume will be considerably increased. Particularly in the larger hospitals, staff, room, and plant are not nearly adequate for present needs, working under good conditions, let alone extra demands. Radiologists in private practice are to be allowed to claim from the Government the same sums per service that are paid to the hospitals for X-ray work. These are detailed in a Schedule and are expected, under N.Z. conditions in private practice, to cover costs only. Radiologists will require to be recognised for the purpose by the Government and will be allowed to charge further fees to the patient over and above the sums mentioned. Final details of the Government allowances, and extras chargeable, remain to be fixed. The arrangements were passed in Parliament before the radiologists commented on them. It is believed that a firm of dealers in radiological equipment and a hospital secretary advised the Government. The radiologists met soon after the enactment, and are now conducting negotiations with the Government.

Royal Society of Medicine

On Monday, Oct. 27, at 2.30 P.M., Mr. Harold Round, M.D.S., will give his presidential address to the section of odontology. He will speak on the value of a dental department in a general hospital. On Saturday, Nov. 1, the section of physical medicine will meet at Bath. There will be clinical demonstrations at the Royal National Hospital for Rheumatic Diseases at midday, and in the afternoon a demonstration of hydrotherapy in the Royal Baths followed by a discussion on its value in rehabilitation.

Appointments

FORGACS, PAUL, L.R.C.P.: temp. asst. M.O. for Buckinghamshire.
PHILLIPS, T. J., M.R.C.S.: temp. asst. ophthalmic surgeon to the Liverpool Eye, Ear and Throat Infirmary.

The Chief Inspector of Factories has appointed the following examining surgeons:

ABBAT, P. D., M.B. Manc.: for Ludgershall, Wilts.
HAWKE, R. F., L.M.S.S.A.: for Crawley, Sussex.
KNOWLES, R. R., M.B. Lpool: for Birkenhead, Cheshire.
MCDONALD, CARRICK, M.B. Glasg.: for Kilwinning, Ayrshire.
MAXWELL, E. C. W., B.A. Camb., M.R.C.S.: for Robertsbridge, Sussex.
WOOD, W. C., M.D. Lond., F.R.C.S.: for Penshurst, Kent.

Births, Marriages and Deaths

BIRTHS

ADLER.—On Oct. 14, at Epping, the wife of Captain Paul Adler, R.A.M.C.—a son.
BICKFORD.—On Oct. 17, at Bideford, the wife of Flight-Lieutenant B. John Bickford, F.R.C.S., R.A.F.V.R.—a daughter.
MATHER.—On Oct. 15, at Wigan, the wife of Surgeon Lieutenant Northage de Ville Mather, of Todmorden—a son.
MILLER.—On Oct. 5, in Capetown, the wife of Captain Ashton Miller, R.A.M.C.—a daughter.
MURPHY.—On Oct. 10, at Louth, Lincolnshire, the wife of Lieut.-Colonel R. Murphy, R.A.M.C.—a son.
O'SHEA.—On Oct. 10, in Dublin, the wife of Major Patrick O'Shea, R.A.M.C.—a daughter.
WILSON.—On Oct. 12, at Ongar, Essex, the wife of Dr. Peter Wilson, R.A.M.C.—a son.

MARRIAGES

CELLARS—ROLLO.—On Oct. 18, at Cupar, James Rintoul Cellars, M.B., Squadron-Leader, R.A.F., to Margaret Kilgour Rollo.
MCENTEE—PRAG.—On Oct. 11, at Englefield Green, John Charles McEntee, M.D., to Nora Ruth Walding Prag.
PEARSON—SLATER.—On Oct. 16, at Buckingham, George Bruce Pearson, L.R.C.P.E., to Mary Beatrice Slater.

DEATHS

BOYLE.—On Oct. 15, Henry Edmund Gaskin Boyle, O.B.E., F.R.C.S., D.A., aged 66.
COHEN.—On Oct. 16, at Edgware, George Alexander Cohen, M.B. Edin., coroner for East Middlesex.
DAVIDSON.—On Oct. 12, Hugh Allan Davidson, D.S.O., Croix de Guerre, M.B. Aberd., lieut.-colonel R.A.M.C., of Dunnydeer Mains, Insch, Aberdeenshire, aged 66.
GERVIS.—On Oct. 13, Henry Gervis, M.B. Camb., J.P., late of Brighton, aged 78.

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ORIGINAL ARTICLES

SOME PROBLEMS OF WOUND INFECTION*

A. A. MILES, M.A. CAMB., F.R.C.P.
PROFESSOR OF BACTERIOLOGY, UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL

E. H. Kettle once deplored the dominance of the bacteriologist in the study of infective inflammation—a dominance which he felt not only elbowed out the more profitable study of the host's reaction but also obscured the problem with so many irrelevant facts about bacteria that the wood could not be seen for the trees (Kettle 1927). This lecture is an attempt to show how much the "dominant bacteriologist" has contributed to the study of wound infection; his contribution is extensive and significant, but has been more successful in prophylaxis than in cure.

EARLY AND LATE INFECTION COMPARED

The bacteriologist is, in the first place, faced with freshly inflicted wounds. In them he finds bacteria apparently derived from skin, alimentary tract, clothes and surrounding dirt. The cultivation of swabs from very early wounds yields mainly indifferent cocci, both staphylococci and streptococci, diphtheroids, aerobic spore-bearers of the *Bacillus subtilis* type, and anaerobic spore-bearers. Later swabs yield a greater variety: for example, 1–3 days after infliction, wounds contain *Streptococcus pyogenes* and *Staphylococcus aureus* in addition to the bacteria already mentioned. The increase may in part be due to the growth of small initial doses of bacteria into recognisable prominence. But figures for swabs taken 4–12 days, and 13–30 days after infliction show that while spore-bearers and indifferent cocci die out there is a still greater incidence of *Strep. pyogenes*, *Staph. aureus* and *Pseudomonas pyocyanea*. The incidence of coliforms remain relatively high. It is, in fact, the frankly pyogenic bacteria—streptococci, staphylococci and the coliforms—which appear in the later cultures (Miles et al. 1940, Spooner 1941). These newly appearing bacteria may have been introduced at the time of wounding or added later. If we assume that all the bacteria in a wound grow from small numbers introduced at the time of wounding, we shall have difficulty in explaining why *Staph. aureus* and *Strep. pyogenes* often appear for the first time as late as 3 weeks after wounding, for they are not given to lying dormant in the tissues. It is easier to maintain that they are added after the infliction of the wound; and indeed, particularly in the case of the streptococci, we have strong circumstantial evidence in support of it. The pyogenic streptococci can be subdivided by serological tests into a number of well-defined types. In civilian life they reside in the upper respiratory tract of some 5–10% of the population, and if we were to select a few hundred people in a haphazard fashion, we should find that their throat streptococci belonged to a wide variety of types; no one type would predominate. But when 50 of these wounded people are gathered from different places into one ward, not only may as many as 40% be infected with streptococci but the streptococcal types are not distributed in quite so haphazard a manner as we might expect had they been picked up from the environment at the time of wounding; certain types predominate, which suggests an infection from a common source. Moreover, a predominating type often turns up late in the history of wounds under treatment in a single ward, and by keeping a close watch on the noses, throats, wounds and cut fingers of patients, nurses and medical staff it is often possible to trace the apparent course of infection by one type of streptococcus from wound to wound, wound to throat, throat to nurse's cut finger, and cut finger to another wound.

In certain Hertfordshire hospitals we seldom found *Strep. pyogenes* in wounds sampled within a few hours of infliction; yet the incidence of streptococcal wound infection in the wards varied from 20 to 70%. Colebrook and Francis (1941) estimate that 5% of their burns were initially infected with *Strep. pyogenes*, and found 70% infected in hospital. Besides streptococci, there are added infections by *Staph. aureus*, coliforms, *Proteus vulgaris*, and occasionally the tetanus bacillus, Welch's bacillus and the diphtheria bacillus. It is not uncommon to find added infections of all kinds in half the wounds of a ward. Not all these infections are serious or give rise to clinical signs of infection, but there is evidence that (apart from the quite large numbers of patients who are made seriously or even fatally ill by added infection) many milder added infections retard wound healing and certainly increase the risk of the cross-infection of clean wounds by constituting an open reservoir of potentially pathogenic bacteria.

Added streptococci originate in the nose and throats of carriers. It is the skin, and especially the skin recently infected with staphylococci, that is usually regarded as the source of *Staph. aureus*. But it is probably truer to regard the nose as its more constant origin. *Staph. aureus* may infest the deeper crypts of the skin, but on the skin itself it is a superficial transient contamination. It seems clear that the nose is the source of the skin staphylococcus, since both superficial and deep skin carriers are commonly nasal carriers. In a few tests of such double carriers in which a precise serological typing was possible the staphylococci from the nose and skin proved to be of the same subtype. The importance of the streptococcal carrier is fully appreciated; the potential dangers of the nasal carrier of *Staph. aureus* are less obvious, but none the less important in combating hospital infection, for up to 90% of the wounds in a ward may be infected with it.

A rough estimate of the extent of this nasal danger may be made by piecing together the scanty information about staphylococcus carrier-rates (Hallman 1937, McFarlan 1938, Gillespie et al. 1939), and including some recent surveys that Dr. A. C. Cunliffe and Dr. A. M. Thomas have been making in Hertfordshire. It appears that the staphylococcal carrier state in the nose, far from being the result of a temporary infection or contamination, may be the result of an early colonisation of the nose that gradually disappears with advancing age. The nose of the newborn child is sterile, but at 2 weeks old 90% of the infants in hospital wards are infested with *Staph. aureus*. The incidence drops to 50–60% in young children and to 20–40% in young adults. Of these carriers, at least half are profuse, and remain so for months on end. The figures are appropriate to our inquiry, for they were obtained mainly from hospital patients, staff or medical students, and may be said to represent the staphylococcal environment of a wounded person in hospital. We do not as yet know whether all strains of true *Staph. aureus* are equally pathogenic. The common infectors of the nose may be relatively innocuous, and wound infection may be due to more rarely occurring virulent types. But until we know more about the properties of the staphylococcal subtypes it is reasonable to assume that the high incidence and relative permanence of *Staph. aureus* nasal carriers in hospital personnel and patients, and the consequent high skin-carrier rate, is responsible for the predominance of *Staph. aureus* in the infections of war wounds. It is impossible to exclude all nasal carriers from participation in surgical work. But the risk of infection from them is reduced to a minimum if all those engaged in surgical manipulation of wounds are compelled to wear impermeable masks in the wards as well as in the theatre.

As a result of many bacteriological surveys of wounds, it may be said that the bacteria introduced into wounds by direct enemy action are much less disabling in the sum total of their after-effects than those introduced after infliction. It is also true that a great deal of this added infection is preventable. In peace-time the risk of hospital infection was small, though definite. But the aseptic technique of peace has not stood the strain of a war in which at any moment a base hospital may be overwhelmed with the additional duties of a casualty clearing station. The surgeons were the first to set their house in order over hospital infection, and in the process became part-founders of medical bacteriology. But the initiative in the fight against hospital infection has lately passed to the fever hospital and to the obstetric and children's ward, and it is to the bacteriologists who

* Abridged from the Kettle memorial lecture, delivered at the Welsh National School of Medicine in May, 1941.

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worked in these places that we owe our present impetus in tackling war wound infection. The surgeon already has the prophylactic techniques at his disposal, and a rearrangement of their emphasis and application should suffice to make the wards and theatres safe.

Last year Dr. Joyce Wright and I found the hospital-infection rate in a certain neurosurgical ward at times rose as high as 30%. In four months, 15% of all wounds —air-raid or operation—were infected in hospital. The figure was comparatively low, because a careful forceps-dressing technique was employed, but nevertheless *Strep. pyogenes* was spreading from patient to patient. During the air-raid lull of the new year the ward dressing technique was carefully revised. Masking was rigidly insisted on during dressing, and a new routine instituted. Since that time Dr. Wright has maintained a detailed bacteriological watch on the whole unit. The technique was maintained even when three separate convoys of air-raid casualties had filled the wards to their limit, and the result was excellent. In spite of the presence of *Strep. pyogenes* in chronic and newly admitted wounds in the throats of patients and staff (including an epidemic of a type 4 in the throats of 7 people), and in the air of the wards, the number of patients with added infections in a second 4-month period has been 4. Of these infections 3 were in trivial wounds of the arm and leg, which were dressed by the ordinary technique; they constitute an additional proof of the efficacy of the improved precautions, for the head wounds of the same patients were dressed by the improved technique and remained without added infection (McKissock et al. 1941).

With the bacterium already established in the wound the issues are less definite. Dominating the scene is the purulent wound, infected with the pathogenic streptococci and staphylococci and those junior partners in the pyogenic axis—the various coliforms, *P. vulgaris* and *Ps. pyocyanea*. It is worth noting that we have not yet exhausted the information we can get from the bacteria themselves in explaining the variations in severity of these pyogenic infections and the changes in bacterial flora that accompany healing or exacerbations of infection. Next in numerical importance is the wound in which the initially infecting organisms, mostly saprophytes, die out in a few days and stimulate little, if any, tissue reaction. Such wounds might be called contaminated rather than infected, and they solve their own problems by never proceeding to infection. Finally, there is the wound in which essentially saprophytic bacilli find an opportunity to instigate a gas gangrene. These bacilli, in the order of their frequency in wounds, are *Clostridium welchii*, *Cl. sporogenes*, *Cl. septicum*, occasionally *Cl. œdematiens*, and a host of more or less well-defined species, all spore-bearing anaerobes. I call them essentially saprophytic, for in most wounds they die out as rapidly as other contaminants like *B. subtilis*, sarcinæ and micrococci. In a minority of wounds they may multiply with other bacteria in a superficial necrotic layer of tissue, but it is only in a few wounds so infected that gas gangrene supervenes. The opportunity for the offensive germination of the gas-gangrene bacilli is provided by areas of tissue, usually those denuded of oxygen, in which the reducing intensity, chemically speaking, is increased to a point that allows the growth of anaerobes, and this opportunity is largely removed by clearing from the wound foreign bodies, dead tissue, and anything likely to kill the remaining healthy tissue.

So far there is little definite information on the importance of those differences we can detect in the strains of *Cl. welchii* isolated from human flesh wounds. Robertson and Keppie (1941) found that there is a tendency for *Cl. welchii* strains from gas-gangrenous wounds to produce more powerful toxins than those from the merely contaminated wounds, and that the toxigenic powers of some of these gas-gangrene strains tend to be inhibited less by changes in the hydrogen-ion concentration of the media than those of the more saprophytic strains. But powerfully toxigenic strains turn up in contaminated wounds, and fatal gas gangrene occurs with the feebly toxigenic strains. We have found a similar lack of definite association between the capacity of toxin-free *Cl. welchii* strains to resist the bactericidal power of human blood, and the capacity to produce gas gangrene. Our most resistant strain came from a small granulating scalp wound that was healed in 10 days.

METHODS OF TREATMENT

To combat these bacilli we have various antitoxins, and a number of antibacterial chemotherapeutic agents, both natural and synthetic. Of the natural antibacterial substances, elaborated by bacteria and fungi, few have received extensive therapeutic trial. Gratia (1930) in Belgium and Dubos (1939) in America have both described such substances, the one from a fungus, the other from spore-bearing bacilli. In this country we have Fleming's discovery of penicillin, which is powerfully antibacterial. A full test of its value must await its production in large quantities. It has no observable toxic effect on phagocytes in antibacterial concentrations, and its antibacterial effect is not inhibited in the presence of organic matter. Its action, like that of the sulphonamides, is apparently bacteriostatic, an effect that permits the defences of the body to take adequate action against the invader (Fleming 1929, Abraham et al. 1941). The synthetic antibacterial agents include the sulphonamides and the flavines. The flavines are antiseptic rather than chemotherapeutic, though two, proflavine and 2:7 diamo-acridine, by reason of their low toxicity for tissues (Russell and Falconer 1941), approach chemotherapeutic rank. At present we know little of their efficacy against the gas-gangrene bacteria.

The sulphonamides have been extensively tried in pyogenic wounds and there is little doubt of their prophylactic and therapeutic value. They are inhibited to some extent by organic matter, particularly if the products of extensive tissue breakdown are present. But even in the presence of pus their local application reduces the streptococci, staphylococci, coliforms and spore-bearing anaerobes in wounds. There is every justification for their early employment in the treatment of such wounds, for even if they fail to destroy the bacteria they may prevent their multiplication, and thereby permit the delays in full surgical treatment that are sometimes inevitable in war. In the treatment of gas gangrene there is no similar clear-cut indication for the confident exhibition of these drugs. The occasions for test in man have been few, and in animals the result of numerous attempts to treat experimental gas-gangrene are conflicting. Attempts vary in the animals used, the dose of bacteria, and the mode of applying the drug. This variety is in a sense helpful, for the common features that can be abstracted from it tell us where the truth lies. First, the susceptibility of the gas-gangrene bacilli in the test-tube is of a much lower order than that of the streptococci, and this low susceptibility is reflected in the animal, where the oral administration of the drugs is relatively ineffective. Local therapy with the solid drug, in whose vicinity one can expect maximum concentrations, is much more effective. In the second place, chemoprophylaxis, achieved by introducing the drug along with the infecting bacilli, is more successful than chemotherapy, which only prolonged the life of animals in a few cases, and in fewer cases saved it. *Cl. welchii* infections are most successfully treated, *Cl. septique* less, and *Cl. œdematiens* least. With regard to the effect of the different sulphonamides, there is greatest disagreement over *Cl. welchii*; in general, the best are sulphathiazole and sulphapyridine, with sulphanilamide a close second. With *Cl. septique* the order is sulphathiazole, sulphanilamide and sulphapyridine, with dissidents in favour of reversing the last two; and there is agreement that sulphathiazole is outstanding with *Cl. œdematiens*. Fleming (1941) has suggested that for historical reasons we tend to think of sulphanilamide as best for streptococci, sulphapyridine for pneumococci, and sulphathiazole for staphylococci, whereas in fact the last drug is active against all three cocci. The same holds good for the gas-gangrene organisms; sulphathiazole is not merely the best drug for *Cl. œdematiens*; it appears on balance to be the best drug for the whole gas-gangrene trio.

Gordon and McLeod (1941) differ sharply from the prevailing trend of experiment with artificial *Cl. welchii* and *Cl. septique* infections. They find no trace of curative action in sulphanilamide and sulphapyridine, and only a slight prophylactic action in sulphapyridine. The reason for the difference does not lie in the dose of bacteria employed, which was 10 m.l.d., nor in the dose of drug administered. It may lie in the mode of infection, for apparently the bacteria and the drugs were introduced into artificially damaged limbs, with a syringe,

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whereas most of the workers who report favourably on the sulphonamides infected their animals in open wounds and applied the drug in the same spot. If this is the reason it indicates even more strongly the necessity for a maximum local concentration of the drugs, such as would follow the precise application of the powder to the open seat of infection.

Sulphathiazole appears to owe some of its local efficacy to its moderate solubility, which, lying midway between that of sulphanilamide and the more insoluble sulphapyridine, ensures that it goes into solution slowly but in sufficiently effective concentrations. All three drugs diffuse slowly through dead tissue, but as soon as they reach tissues with active circulation they are carried away by the blood-stream. This continuous drain on the central core of solid drug in the wound results in a steep fall in concentration as one passes from wounded healthy tissue. It would be reasonable, as Hawking (1941) suggests, to supplement local with oral administration of the drug and thus, by maintaining a given concentration in the general circulation, to reduce the speed of that drainage.

ANTITOXIN AND SULPHONAMIDE ACTION

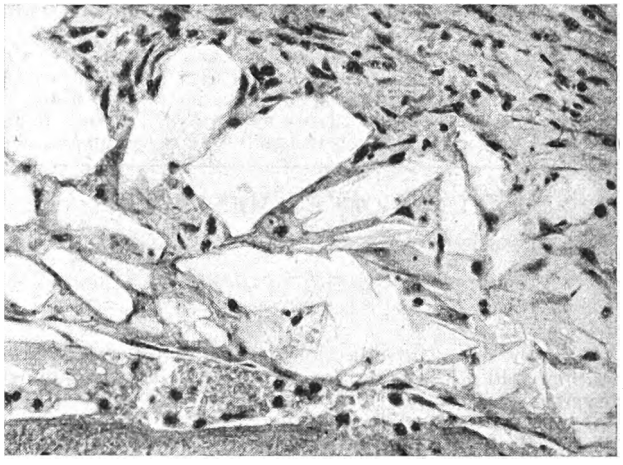
The use of antitoxin, either as an addition or an alternative to the sulphonamides, has the support of experimental work. Henderson and Gorer (1940) found antitoxin better than sulphanilamide or sulphapyridine; drug and antitoxin administered together were much more effective than either alone. Gordon and McLeod found it greatly superior to the sulphonamides as a prophylactic, and the small success they had in curing recently established infection was due entirely to antitoxin. They suggest that the antitoxin might profitably be applied locally in the treatment of gas gangrene. The analogy with local sulphonamides suggests that this would be highly effective, but we might explore the implications of this analogy before we accept it, particularly in view of the severe local reactions reported to have followed this kind of antitoxin therapy.

The effect of antitoxin and the sulphonamides on the bactericidal power of human blood for *Cl. welchii* gives some indication of their action in the body. In one experiment, for example, typical of many we have recently made, an average of 1 bacillus survived from an inoculum of 4000 living bacilli in 100 c.mm. of blood. A comparatively large dose of *Cl. welchii* toxin (2 mouse m.l.d.), though it lysed the blood, depressed the bactericidal power only slightly; an average of 8 bacilli survived. But the addition of enough antitoxin to neutralise the toxin, far from restoring the bactericidal power, reduced it still more; 45 bacilli survived. *Cl. welchii* is killed in blood only in the presence both of living phagocytes and complement, and it can be shown that the combination of toxin and antitoxin, by fixing some of the complement, impairs the efficacy of the natural antibacterial mechanism. The blood-bacterium mixture is notoriously sensitive to antiseptics, yet the three sulphonamides, in a final concentration of 6·25 mg. %, depressed the bactericidal power only slightly and temporarily. After 2 hours, unheated blood kills better than sulphonamide blood. The effect is reversed in 24 hours; sulphonamides plus blood are more effective than blood alone. Leucocytes and complement contribute largely to this sulphonamide effect, for in heated blood the drugs are comparatively inactive. Penicillin in the same concentration is much more active than any of the sulphonamides, and at no time appears to affect the leucocytes. In applying these results with blood to therapy we must avoid what Kettle used to call the Bovril fallacy. The victim of this fallacy, regarding a tube of blood with the melancholy intentness of the bullock in the advertisement, and murmuring "Alas my poor brother," insists on regarding its identity with the whole body as complete. But the results do suggest that in the wound area, where the supply of blood and therefore of complement may be restricted, the local injection of strong antitoxin to settle the toxic issue might prejudice the issue between phagocytes and bacilli. Circulating antitoxin, on the other hand, which is accompanied wherever it goes by complement, is open to no such objection, and would certainly limit the specific intoxication to relatively anæmic tissues.

In this comparison of sulphonamides and antitoxin we must remember the size of their constituent molecules. The work of Menkin (1940) suggests that large molecules of foreign protein in the circulation would be selectively removed from the blood by early inflammatory tissue, and that they would be as definitely excluded from such tissue when the inflammation had proceeded to a later stage. The dye Trypan Blue behaves in the same way towards inflammatory tissue, and experiments with tissue inflamed by the *Cl. welchii* toxin show that early fixation and later rejection of the dye occur in the inflamed part. Circulating antitoxin is likely to be similarly affected; it remains to be seen whether this is in fact so, and whether the antitoxin "fixed" in the inflamed tissue is active against the toxin that produced the inflammation.

The change over from apparent avidity to inertness on the part of the local lesion may explain the enormous difference that has been observed between prophylactic and curative doses of antitoxin. In Gordon and McLeod's experiments the minimum curative dose of antitoxin a few hours after infection was 200–600 times the amount required for prophylaxis.

These considerations do not apply to the sulphonamides. A few experiments in rabbits with early and late toxin-induced inflammation show that there is no similar fixation or exclusion of circulating sulphanilamide. Presumably the molecule is small enough to be independent of these peculiar features of the inflammatory lesion; and it penetrates wherever it can diffuse, either from a deposit of solid drug, or from the circulation. Some experiments by Dr. L. E. Glynn (1941) illustrate the small deleterious effect of the solid drugs. He introduced clots of blood into pockets in the subcutaneous tissue of the rabbit and compared the organisation of the clot with and without powdered sulphonamides. Solid sulphanilamide disappeared in 24 hours. It could diffuse directly across the fascial sheath of the underlying muscle, for these were damaged to the depth of 4–5 muscle-fibres; this negligible layer of necrosis, 0·2 mm. in depth, was soon organised. Sulphapyridine produced occasional necrosis, sulphathiazole none. There were indications that sulphathiazole and sulphapyridine depressed the formation of fibroblasts to a slight extent, but the slightness is well illustrated in a section in which proliferating fibroblasts are seen actively invading the spaces immediately between the persistent crystals of sulphapyridine (see figure).



Rabbit fibroblasts growing between crystals of sulphapyridine, 7 days after introduction. (By permission of Dr. L. E. Glynn.)

It is not my primary intention to weigh the measures against infection in the balance, for there are many considerations upon which I have not touched. My survey of wound infection covers only a fraction of the ground, and much of what I have said I owe to the kindness of those who have allowed me to cite from unpublished work. Ogilvie has said that gas gangrene has its cause in a particular opportunity rather than a particular organism. If we have failed to define the opportunity we are in no position to be confident about the means of denying it to the saprophytic clostridia

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concerned. But in the choice of a prophylactic agent against gas gangrene it must be remembered that the sulphonamides, and particularly sulphathiazole, have the great advantage of attacking most of the species that contaminate wounds; antitoxin is species-specific only. Moreover, the suppression of the other contaminants by sulphonamides removes elements which, if left to proliferate, might kill tissues and provide a nidus for the germination of the gas-gangrene bacillus.

The final test must, of course, be made in man. If the surgeon is convinced that drug or serum is harmless to the patient but needs to convince himself that it is helpful, there is every justification and every need for a clear-cut division of cases into control and test groups. And it cannot be too strongly urged that the treatment of alternate cases makes a simple and effective division. To many this arrangement will smack of the statistician, who is often unjustly accused of demanding unnecessarily difficult circumstances in the collection of data from clinical material. They may find a support for their resentment in a quotation that prefaced the 1935 volume of the *British Journal of Experimental Pathology*, which many of us believed Kettle himself suggested to the editor. It was from an O. Henry story of two gold prospectors, Pratt and Idaho, marooned for the winter in a mountain hut. They find in the hut two books to solace their exile, the Rubiayat of Omar Khayyam and a pocket encyclopædia. Idaho, who takes the book of verse, says with scorn, "What you've got is statistics, the lowest grade of information that exists. They'll poison your mind. Give me old K. M.'s system of surmises." But the moral of the story does not lie in the quotation. When Idaho and Pratt set out from their winter prison to woo the rich Widow Sampson, the one with poetry the other with statistics, it was Pratt who won her with his low-grade information.

* * *

It may seem impious to have chosen a view of Kettle's in order to dissent from it when he can no longer reply. But to do so would be in itself a memorial to Kettle as we knew him, for he was kind to dissenters, disliked piety, and was critical of unthinking respect. "You will always be treated politely," he once told a difficult worker who complained of a disrespectful attitude in the laboratory, "but respect you will have to earn." He would be content to let his views earn their full respect as time went on. And even where we first dissent, we shall find that the respect for what he said grows as the later accumulation of knowledge endorses its prophetic wisdom.

REFERENCES

Abraham, E. P., Chain, E., Fletcher, C. M., Gardner, A. D., Heatley, N. G., Jennings, M. A. and Florey, H. W. (1941) *Lancet*, **2**, 177.
Colebrook, L. and Francis, A. E. (1941) *Ibid*, **1**, 269.
Dubos, R. J. (1939) *J. exp. Med.* **70**, 1.
Fleming, A. (1929) *Brit. J. exp. Path.* **10**, 226.
— (1941) *Proc. R. Soc. Med.* **34**, 342.
Gillespie, E. H., Devenish, E. A. and Cowan, S. T. (1939) *Lancet*, **2**, 870.
Glynn, L. E. (1941) *J. Path. Bact.* **53**, 183.
Gordon, J. and McLeod, J. W. (1941) *Lancet*, **1**, 407.
Gratia, A. (1930) *Bull. Soc. nat. Chir.* **56**, 345.
Hallman, F. A. (1937) *Proc. Soc. exp. Biol. Med. N.Y.* **36**, 789.
Hawking, F. (1941) *Brit. med. J.* **1**, 511.
Henderson, D. W. and Gorer, P. A. (1940) *J. Hyg. Camb.* **40**, 345.
Kettle, E. H. (1927) *Lancet*, **1**, 1169.
McFarlan, A. M. (1938) *Brit. med. J.* **2**, 939.
McKissock, W., Wright, J. and Miles, A. A. (1941) *Ibid*, **2**, 375.
McLean, D. (1941) *Chem. & Ind.* **40**, 219.
Menkin, V. (1940) Dynamics of Inflammation, New York.
Miles, A. A. et al. (1940) *Brit. med. J.* **2**, 855.
Robertson, M. and Keppie, J. (1941) *J. Path. Bact.* **53**, 95.
Russell, D. S. and Falconer, M. A. (1941) *Brit. med. J.* **1**, 378.
Spooner, E. T. C. (1941) *Ibid*, **2**, 477.

PNEUMOCOCCAL MENINGITIS

FOURTEEN CASES WITH ONE RECOVERY

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BEFORE the introduction of sulphanilamide and sulphapyridine pneumococcal meningitis was almost invariably fatal, but in the last few years the outlook has been radically altered. There are now large numbers of reported cures, and Coleman (1940) estimates the fatality of the disease to be only about 35%. While this figure is true of the reported cases, it in no way gives an accurate picture of the prognosis. Our own experience has been discouraging and for this reason I am publishing the results of treatment of the 14 cases admitted to the Birmingham United Hospital since the beginning of 1939, a period of two years.

The main features of these cases are shown in the table; 6 appeared to be primary (i.e., unassociated with any other forms of infection) and of these, 1 recovered. This patient, a man of 22, was admitted within eight hours of the onset of his symptoms; the dosage of sulphapyridine was at least 12 g. daily, administered both by mouth and intramuscularly, and he made a good functional recovery with no permanent residual defects. Of the remaining 8 cases, 2 were associated with catarrhal otitis media, 1 with ulcerative endocarditis which was probably the primary source, 3 were complications of lobar pneumonia and 2 were associated with bronchopneumonia; 4 cases died within twenty-four hours of admission. All the cases (except case 5) were actually admitted with meningitis; 10 were unconscious. Case 4 recovered from her meningitis, as was shown at autopsy, but eventually succumbed to toxæmia associated with lobar pneumonia and empyema. Case 5 appeared to be making satisfactory progress when neck rigidity reappeared without any signs or symptoms to suggest a recurrence of meningitis. She died suddenly and autopsy showed bilateral thrombosis of the jugular veins, that on the right side extending down to the right auricle; the ears showed slight catarrhal changes only, and the meningitis was confined to localised areas, suggesting that cure would have been obtained but for this unexpected complication.

It will be seen that 2 cases had acute ulcerative endocarditis; in case 13 this was probably a primary endocarditis. Ruegsegger (1938) has pointed out that pneumococcal meningitis is often a terminal event in these cases. Case 6 illustrates many of the difficulties that may be encountered in treatment.

CASE 6.—A single woman aged 29. Splenectomy five years previously for acholuric jaundice. Admitted severely ill and slightly irrational, a few hours after a rigor and right-sided pain. Signs of right-sided lobar pneumonia. Reacted well to sulphapyridine but soon developed severe nausea and vomiting, which continued even with intramuscular injections. Temperature was dropping to normal on the third day, and chemotherapy was then stopped on account of the vomiting. Three days later signs of meningitis appeared and pneumococci were cultured from cerebrospinal fluid. Sulphathiazole (18 g.) was given for forty-eight hours, but only after the addition of sulphapyridine as well did symptoms and temperature improve (sulphathiazole 19 g., and sulphapyridine 19 g. over ninety-six hours.) Further 12 g. of sulphapyridine continued for next three days. Appeared to be clinically cured on seventh day after onset of the meningitis; c.s.f. then contained 43 cells (80% mononuclears) and normal amount of sugar. A week later temperature rose again and right otitis media developed with reddening of drum; this reacted to chemotherapy fairly rapidly, but pyrexia up to 102° F. continued for next two weeks, uninfluenced by sulphathiazole or sulphapyridine. Mastoid infection ruled out by two aural surgeons, and diagnosis of infective endocarditis seemed likely in absence of any other focus. Blood-cultures at this period gave heavy growth of pneumococci. Diagnosis strengthened by occurrence of embolus in left brachial artery five weeks after admission. After subsidence of original meningeal infection mental condition had remained good, but a week after embolus signs of meningitis again became definite and c.s.f. heavily infected with pneumococci. Rapidly deteriorated and died six weeks and three days after onset of infection. Autopsy showed generalised pneumococcal meningitis with crumbling acute ulcerative endocarditis affecting mitral valve. Ears showed no evidence of gross infection; nasal sinuses all healthy.

Finland, Brown and Raugh (1938) point out that chemotherapy is often of little avail in this type of massive bacteræmia and suggest that specific antiserum should always be given in such cases. In case 6 this proved impossible, owing to unexpected difficulties in typing. The organism responsible was thought at first, according to the Neufeld rapid typing method, to be group III, but the cultural characteristics showed that

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SUMMARY OF FINDINGS AND RESULTS IN 14 CASES

Case	Sex	Age (yrs)	Associated disease	Duration of meningitis before treatment	C.S.F.	Sulphapyridine dosage (g.)	C.S.F. levels (mg. per 100 c.cm.)	Type of pneumococci	Outcome	Autopsy findings
1	M	57	Nil	1 day	At 24 hrs. purulent, sugar 0; at 48 hrs. sugar 12 mg. 100 c.cm.	21 in 72 hrs.	14·7; later 10	IV	Died 110 hrs. after onset	Pneumococcal meningitis, chiefly involving choroid plexus
2	M	66	Nil	1 ,,	Turbid	19 in 72 hrs.	..	III & IV	Died 72 hrs. after adm.	Pneumococcal meningitis
3	F	49	Nil	?	,,	16 in 54 hrs.	2·5 (after 12 hrs.)	..	Died 54 hrs. after adm.	Autopsy refused
4	F	62	Rt. lob. pneum.	? 3 days	First obs., 375 cells (93% mononuclears); second clear	Uncertain	..	..	Died 13 days after adm.	Small localised empyema rt. base; meninges clear
5	F	62	Catarrhal ot. med.	4 days	85 cells	38 in 11 days	..	III	Died 17 days after onset	Bilateral jugular vein thrombosis; localised areas of meningitis.
6	F	29	Lob. pneum. Inf. endocard.	? 1 day	First obs. turbid; second 30 cells; third turbid	31 in 176 hrs.*	..	Could not be typed	Died 45 days after onset of lob. pneum.	Infective endocarditis; diffuse pneumococcal meningitis
7	M	22	Nil	14 days	Turbid (2 obs.)	18 in 80 hrs.	4 (after 10 hrs.) 6 (after 24 hrs.)	..	Died 4 days after adm.	Pneumococcal meningitis; internal hydrocephalus
8	M	1½	Br. pneum.	Few hours	..	1 (intramusc.)	..	..	Died 8 hrs. after adm.	Bronchopneumonia; pneumococcal meningitis
9	M	58	Lob. pneum.	? 7 days	Slightly turbid	3 ,,	..	Not typed	Died 12 hrs. after adm.	Rt. lobar pneumonia; pneumococcal meningitis
10	M	1	Nil	? 2 days	Turbid	? 4	..	,,	Died 36 hrs. after adm.	Pneumococcal meningitis
11	M	22	Nil	8 hrs.	First obs. turbid; second normal	17 (intramusc.) 49 by mouth in 16 days	..	,,	Disch. symptom-free 35th day after adm.	..
12	M	49	Ac. tracheo-bronch.	2 days	..	..	..	III	Died 15 min. after adm.	Pneumococcal meningitis; acute tracheobronchitis
13	M	62	Ulc. endo-card.	?	185 cells (19% polymorphs)	Uncertain	..	IV	Died	Pneumococcal meningitis; ulcerative endocarditis
14	M	50	Ot. med.	2 days	Turbid.	3 (intramusc.)	..	III	Died 12 hrs. after adm.	Pneumococcal meningitis; otitis media

* Plus sulphathiazole 19 g.

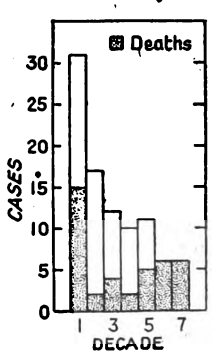
this was not so. The pneumococcus isolated from the blood-stream later in the illness was equally difficult to type and even after mouse passage failed to agglutinate with any of the sera of the 32 types described by Collins. It is hard to account for this finding but it seems likely that the development of resistance to sulphapyridine altered some of the cultural characteristics of the organism (cf. Ross 1939). It is important to continue adequate chemotherapy for many days after the subsidence of the pyrexia to give the patient every protection during the formation of antibodies, especially with strains which rapidly become resistant to chemotherapy when dosage is insufficient. The terminal meningitis appeared to be secondary to the endocarditis, though it was possibly an exacerbation of the original infection. It is difficult to say when the valve became infected, but it is clear that sulphapyridine, though given in adequate doses on the first occasion for an insufficient length of time, was incapable of preventing this complication. It is possible, of course, that the original meningitis and the ulcerative carditis both arose from the septicæmia accompanying the lobar pneumonia.

In none of these 14 cases was specific antiserum used. Sulphapyridine was used in all except one, who died shortly after admission. The doses used, when compared with other reported cases, might be considered adequate, and in case 1 it will be seen that a concentration of 14·7 mg. per 100 c.cm. of c.s.f. was attained in thirty-six hours on moderate dosage.

AGE AND FATALITY

The only constant factor that can be used to account for the lack of response to treatment is the age-incidence. Successful resistance to the pneumococcus depends on the rapid outpouring of antibodies, and these defence mechanisms might be lacking in infancy and the later stages of life. That the fatality is greatly increased in these age-groups is shown in the figure in which 94 cases have been plotted, collected from Allan, Mayer and Williams (1938), Finland, Brown and Raugh (1938), Neal and Appelbaum (1938), Young (1938), Hodes, Gimbel and Burnett (1939), Terry and Beard (1939), Hewell and Mitchell (1939), and the authors quoted by Coleman (1940).

It will be seen that the fatality in the first few years of life (especially in the first year) is extremely high; but that between the ages of 5 and 40 the prospects of cure are good. The fatal cases in this favourable group are usually those with some associated severe infection, such as pan-sinusitis, cavernous-sinus thrombosis or ulcerative endocarditis. After 40 the fatality rapidly rises and I have been unable to find any record of cure in patients over 50. Finland and his colleagues (1938) pointed out that patients in this older group appear to make satisfactory progress for a short time and then suddenly deteriorate either from sudden exacerbation of the meningitis or from some unforeseen catastrophe (as in my case 5). Finland considered that cases associated with an aural condition had a rather worse outlook than other cases. Coleman (1940) in his review of 27 reported cases could not confirm this, and it is noteworthy that Neal and Appelbaum (1938) treated 17 cases associated with an ear condition and obtained a good recovery in 13. The prognosis, then, may be summed up as follows:—



Incidence and fatality in age-groups (94 cases).

1. Pneumococcal meningitis is almost invariably fatal under the age of 1 year, and is usually fatal under 5.

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2. Between 5 and 40 the survival-rate is probably between 80% and 90% in the primary types; in the presence of any severe associated infection the fatality is high.

3. The older age-groups have a bad prognosis; there appears to be an equal chance of survival or death between 40 and 50, but after 50 survival is unlikely.

4. The duration of symptoms probably has an appreciable effect on the outcome: the sooner after the onset of symptoms that treatment is begun the better will be the prognosis.

TREATMENT

Intensive chemotherapy should be instituted immediately on diagnosis. The dosage should be adequate to provide the highest possible concentration of the drug in the cerebrospinal fluid (over 10 mg. per 100 c.cm. of either sulphanilamide or sulphapyridine) in the shortest possible time. To bring this about, the drug must be administered if necessary by all three routes: by mouth, intramuscularly and intravenously (Hodes, Gimbel and Burnett 1939). It is noteworthy that, in the few series of cases reported, sulphanilamide has on the whole given better results than sulphapyridine (Schnitker 1940, Kolmer 1940). It is to be hoped that further observations will be forthcoming to explain or contradict this finding.

In the age-group 5–40, except in those cases which have severe associated infections, sulphapyridine or sulphanilamide should be given in adequate dosage without specific antiserum. With patients under 5 or over 40, however, it seems that specific antiserum ought always to be given. Large doses should be given intravenously to combat the pneumococcal septicæmia, but there is not yet sufficient evidence to show whether it should be given intrathecally in addition. Finland, Brown and Raugh suggest that it should; and the methods they advocate seem to be the most rational way of administering it. They advise intrathecal injection of 5–10 c.cm. of the patient's own serum, withdrawn after the administration of the specific antiserum intravenously, for the provision of complement in the cerebrospinal fluid. They claim that this method is least likely to give rise to undesirable reactions. It is unfortunate that pneumococcal meningitis in these groups is so often fatal within seventy-two hours of its onset, making necessary the utmost speed in the institution of therapy. Few institutions have the necessary antiserum on hand before twenty-four hours have elapsed, a delay which probably proves fatal to most cases.

SUMMARY

In 14 cases of pneumococcal meningitis there was 1 recovery; 7 patients were over 50 and 2 under 2 years.

The age-incidence of these cases and of 80 cases from the literature have been plotted to show fatalities and survivals. Below the age of 1 year and above the age of 50 pneumococcal meningitis is almost invariably fatal. The chief reason for the poor results in this series was probably the age of the patients.

Intensive chemotherapy should be given in all cases, and specific antiserum, in addition, is probably essential for all cases under 5 and over 40.

I wish to thank the honorary staff of the Birmingham United Hospital for permission to publish these cases, and in particular Prof. W. H. Wynn for his advice and criticism.

REFERENCES

Allan, W. B., Mayer, S. and Williams, R. (1938) *Amer. J. med. Sci.* **190**, 99.
Coleman, F. H. (1940) *Lancet*, **2**, 615.
Finland, M., Brown, J. W. and Raugh, A. E. (1938) *New Engl. J. med.* **218**, 1033.
Hewell, B. A. and Mitchell, A. G. (1939) *J. Amer. med. Ass.* **112**, 1033.
Hodes, H. L., Gimbel, H. S. and Burnett, G. W. (1939) *Ibid*, **113**, 1614.
Kolmer, J. A. (1940) *Arch. intern. Med.* **65**, 671.
Neal, J. B., Appelbaum, E. (1938) *Amer. J. med. Sci.* **195**, 175.
Ruegsegger, J. M. (1938) *Arch. intern. Med.* **62**, 388.
Ross, R. W. (1939) *Lancet*, **1**, 1207.
Schnitker, M. A. (1940) Sulphanilamide, Sulphapyridine and Allied Compounds in Infections, London.
Terry, L. L. and Beard, E. E. (1939) *Amer. J. med. Sci.* **199**, 63.
Young, F. (1938) *Brit. med. J.* **2**, 286.

PNEUMOCOCCAL MENINGITIS
RECOVERY WITH SULPHATHIAZOLE

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A BOY, aged 1 year, was admitted to the Eastern Hospital on Feb. 2, 1941, certified to be suffering from measles. There was a history of bronchopneumonia at 6 months. He had had a cough since Jan. 24; a rash had appeared on Feb. 1 and he had vomited on the day of admission. On examination he had a slight cough, but apart from a temperature of 100·4° F. no evidence of measles or other disease was found. During the next three days he remained febrile and was drowsy and moderately ill. Some injection of the ear drums appeared while the lungs remained clear. On Feb. 5 increasing irritability focused attention on the central nervous system, although no neck-rigidity could be detected. Lumbar puncture revealed a purulent fluid under increased pressure, containing 1775 white cells per c.cm. A gram-positive diplococcus present in large numbers on direct examination proved on culture to be a pneumococcus type II. Treatment with sulphathiazole (M. & B. 760) was instituted immediately after the lumbar puncture, in doses of 0·5 g. by mouth every four hours; the dose was gradually reduced over the next six days, the total amount given being 9·25 g. Improvement in the clinical picture could be seen within 24 hours and in 48 hours the child was sitting up feeding himself and the temperature was falling. On the 8th the cerebrospinal fluid contained 570 cells per c.cm. and one pair only of cocci were seen, the culture being sterile. On the 17th, by which time clinical recovery had long been complete, the fluid showed only a slight cellular reaction (30 cells per c.cm.). His further progress was uneventful.

Grossman [1] recently described an attack of pneumococcal meningitis in a baby of 3 months which he treated successfully over a long period with enormous doses of sulphanilamide and sulphapyridine, together with antipneumococcal serum. He was then able to find in the literature only three authentic recoveries from this disease in children under the age of 3 years. The case here described belonged to this unfavourable age-group, yet ran a comparatively mild course. How much this can be attributed to treatment is difficult to say, but improvement coincided so sharply with the administration of sulphathiazole that it is probable that this drug did modify the course of the disease. This is of some importance since treatment of pneumococcal meningitis with sulphapyridine has not been uniformly successful and it may well be that sulphathiazole is to be preferred. Banks [2] has indicated that the latter drug has some advantages in the treatment of meningococcal meningitis.

My thanks are due to Dr. Norman Begg, medical superintendent of the Eastern Hospital, for advice and permission to publish the case.

1. Grossman, A. H. *Arch. Pediat.* 1940, **57**, 355.
2. Banks, H. S. *Lancet*, 1941, **1**, 104.

CORTICAL NECROSIS OF THE KIDNEYS
COMPLICATING PERFORATED GASTRIC ULCER

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Hertzog, in 1913, described a case of bilateral necrosis of the renal cortex in a girl of 10 years who was suffering from a purulent "cryptogenic" peritonitis. Few clinical details were given. At autopsy no cause for the peritonitis was found, and the kidneys presented appearances similar to cortical necrosis of pregnancy. It appears to be the only case recorded of this renal condition complicating peritonitis. The following case was recently seen by us.

Man, aged 45, admitted to Smithdown Road Hospital on March 5, 1941, with signs of perforated peptic ulcer. Had been in hospital 4 years previously with "gastritis." Urine at that time normal, and chest showed nothing of note on X-ray examination.

Operation (Mr. R. J. Crompton) performed under open ether at 1 A.M. on 6th—9 hours after onset of symptoms—and perforated chronic ulcer on anterior stomach wall sutured.

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Peritoneal cavity full of fluid under considerable pressure and containing fibrin. Abdomen was closed without drainage. Urine examined before operation contained trace of albumin, but was not examined microscopically. For remainder of this day urine was passed normally: temperature rose to 99·4° F. On 9th drowsiness and oliguria were noted. Urine contained trace of albumin, moderate number of red cells and some granular casts. Blood non-protein nitrogen 250 mg. per 100 c.cm. Blood creatinine 3·1 mg. per 100 c.cm. On the 10th complete anuria and coma developed. Twitching of limbs with irregular conjugate movements of eyes. On 11th patient died in coma. Illness had been apyrexial, except for rise in temperature on day of operation. Blood-pressure was not recorded, and no bacteriological examination of peritoneal fluid was made.

Autopsy (24 hours after death).—Only permission to examine the kidneys could be obtained, but the presence of a fibrino-purulent peritoneal exudate was noted. Both kidneys were tense, slightly swollen, and presented similar appearances. The subcapsular surface was pale and showed some petechial hæmorrhages. The cortex presented the opaque yellowish-white appearance of coagulative necrosis. A few engorged glomeruli could be seen as red specks. The outline of the necrotic zone had the usual serpiginous form, and extended centrally into the interpyramidal cortex. The junction between normal and necrotic tissue was not notably hyperæmic. The medulla, pelvis and larger branches of the renal vessels appeared healthy.

Histology.—Staining by hæmatoxylin and eosin, Weigert's fibrin stain and a modification of Mallory's aniline blue (Lendrum and McFarlane 1940). The cortex showed almost confluent coagulative necrosis involving both parenchymatous and interstitial elements. There was, however, a continuous subcapsular band (0·25 mm. wide) of normally staining tissue, and small, radially arranged islets of cortex were preserved, particularly in the juxta-pyramidal region. Glomeruli in the necrotic areas showed complete absence of nuclear staining, and engorged, widely dilated capillary loops. Fibrin thrombi were frequently present in glomerular capillaries. Erythrocytes, with or without fibrin, were found in a number of the capsular spaces. Less severely affected glomeruli showed similar engorgement but with preservation of the nuclei. These glomeruli were not demonstrably larger than measured normal controls (150μ). Slight proliferation of the tuft endothelium was occasionally seen in these surviving glomeruli. In one or two the capsular epithelium was swollen and prominent, but was never more than one layer thick. No hyaline fibrils were distinguishable in the tufts. A few glomeruli in the peripheral cortex showed slight thickening of the capsular basement membrane, and one small cyst was seen. A number of glomerular afferent arterioles and intralobular arteries contained fibrin thrombi. In the latter the thrombi were often mural in type, and fibrin infiltration was evident in the walls of one or two of these vessels. The intertubular capillaries in the necrotic zone were packed with polymorphs, a few of which had extravasated. Very occasional hyaline-droplet degeneration, and numerous albuminous casts, sometimes containing red-cells, were seen in the medullary tubules.

DISCUSSION

Mechanism of cortical necrosis.—There is now fairly general agreement that the necrosis is ischæmic in origin, but opinion has differed as to the exact level in the renal vasculature at which obstruction first occurs. The views held by different observers have been reviewed by Dunn and Montgomery (1941). From their own careful observations they conclude that the primary lesion is an extreme dilatation of the glomerular capillaries. The consequent loss of plasma leads to inspissation of the blood, stasis, and finally to complete arrest of the glomerular circulation. As a result thrombosis may occur in the glomeruli, afferent arterioles and intralobular arteries, in that order. In this way varying degrees of infarction are produced. In the early stages the pressure in the arterioles and arteries is increased owing to the distal obstruction, and fibrin is forced into the vessel walls, producing the fibrinoid necrosis which is often seen. In those cases which are associated with pregnancy it seems likely that vaso-spasm precedes, and probably determines, capillary paralysis and dilatation.

Non-pregnancy cases.—Dunn and Montgomery described 8 cases of renal cortical necrosis, none of which was associated with pregnancy, and found a further 18 in the literature. It has been shown experimentally that *Staphylococcus aureus* toxin can produce cortical necrosis of the kidney (Von Glahn and Weld 1935, de Navasquez 1938), and in a number of non-pregnancy cases a bacterial toxin seems to have been responsible. Thus Hertzog's case followed a purulent peritonitis. In our case the peritoneal fluid was not examined, but peritonitis was present. In the cases reviewed by Dunn and Montgomery, scarlatina, sore throat, postoperative streptococcal infection, pneumonia, diphtheria, "grippe" and possibly dysentery were encountered as antecedent infections. One of Dunn's own cases occurred during convalescence from appendicectomy, but the appendix was not acutely inflamed and there was no peritonitis. More recently McFarlane (1941) has described a case in which necrosis of the renal cortex followed multiple fractures and internal hæmorrhage, and in which a bacterial origin could be excluded.

Relation to acute nephritis.—Many of the infective conditions which have been associated with cortical necrosis are recognised causes of acute glomerulonephritis, and some of Dunn's cases appeared to be exceptionally severe manifestations of "war nephritis." As a result of his observations on the early glomerular lesions in acute nephritis (Dunn 1940) he and Montgomery suggest that the essential primary lesion, both in cortical necrosis and in acute nephritis, is a sudden dilatation of the glomerular capillaries, and that these cases of cortical necrosis should be regarded as examples of acute necrotising glomerulonephritis, the occurrence of ischæmic necrosis being determined by the severity of the lesion. The finding of proliferative glomerulitis and epithelial crescent formation in some cases of cortical necrosis forms a link between this condition and glomerulonephritis. Scriver and Oertal (1930) depicted crescent formation in one of their pregnancy cases, and Dunn found glomerulitis in a number of his non-pregnancy cases. de Navasquez (1935), on the other hand, found no proliferative changes in his pregnancy cases, but described crescent formation in cortical necrosis produced by staphylococcal toxin. The appearances described in the surviving tufts in our case might be regarded as evidence of slight proliferative glomerulitis.

Rôle of shock and hæmorrhage.—It has often been remarked that a retroplacental hæmorrhage precedes cortical necrosis of the kidney, and it has been suggested that the sudden fall in blood-pressure is a factor contributing to renal ischæmia. It is a question of interest whether shock, resulting from the perforation, operated in this way in our case. Capillary stasis and hæmoconcentration, both features of shock, would contribute to arrest of the glomerular circulation. The interval between the perforation and the first observation of renal symptoms might be regarded as evidence against this suggestion. McFarlane's case, already quoted, appears to be the only one in which shock and hæmorrhage alone have resulted in necrosis of the renal cortex.

SUMMARY

In a man of 45 bilateral necrosis of the renal cortex followed perforation of a gastric ulcer.

Recent observations suggest that glomerular capillary dilatation, leading to glomerular stasis, is the primary lesion in cortical necrosis. Such dilatation may result from the action of bacterial toxins, and is regarded by some as the lesion common both to cortical necrosis and acute glomerulonephritis. In pregnancy cases vasospasm probably precedes and determines capillary paralysis.

In the case described bacterial toxins were probably responsible, but shock, with its resulting capillary stasis and hæmoconcentration, may have been a contributary cause.

Prof. J. Shaw Dunn generously supplied us with material from one of his cases for purposes of comparison. Our thanks are also due to Dr. J. P. Steel, medical superintendent of Smithdown Road Hospital, for permission to publish this case, and to Mr. R. J. Crompton, resident surgical officer at the hospital, for the use of his operation notes.

REFERENCES

Dunn, J. S. (1940) *J. Path. Bact.* **52**, 169.
— and Montgomery, G. L. (1941) *Ibid*, **52**, 1.
Hertzog, G. (1913) *Beit. path. Anat.* **56**, 175.
Lendrum, A. C., and McFarlane, D. (1940) *J. Path. Bact.* **50**, 381.
McFarlane, D. (1941) *Ibid*, **52**, 406.
de Navasquez, S. (1935) *Ibid*, **41**, 985; (1938) *Ibid*, **46**, 47.
Scriver, W. de M. and Oertal, H. (1930) *Ibid*, **33**, 1071.
Von Glahn, W. C. and Weld, J. P. (1935) *J. exp. Med.* **61**, 1.

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BACTERIOLOGICAL AIR ANALYSIS BY THE CLOUD-CHAMBER METHOD

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THE method to be described was developed in an attempt to evolve a means of bacteriological air sampling whereby the organisms would be isolated in a fluid rather than on a solid medium, as is the case with exposed plates and the air centrifuge.[1] A preliminary report was made in April, 1941, to the epidemiological subcommittee of the Shelter Hygiene Committee of the Ministry of Health. Further work had to be postponed, but the results obtained are published in the hope that others may follow up what appears to be a promising line of investigation.

THE METHOD

The essential features are: first, the trapping of suspended particles by drawing the air sample through a water-vapour mist; and second, the condensation of water on any particles left in suspension by cooling the saturated air. The second principle is derived from that of the Wilson cloud chamber, in which the path of electrons may be observed by depositing on them water droplets condensed from a saturated atmosphere by a reduction in pressure.

The air for analysis is drawn through a mist obtained by directing into a humidifying chamber a fine jet of steam, rapidly cooled by expansion to below 50° C. In preliminary experiments the air was drawn through a large media funnel inverted over the spout of a bronchitis kettle which served as the source of water vapour. Subsequently the funnel was replaced by a bulb-shaped Pyrex glass flask of 5 litres capacity, air and mist being admitted through an opening 2 in. in diameter in the bottom. The lip of this opening was turned up into the flask about ½ in. thus forming a channel in which the condensate forming on the inner wall of the chamber might collect. A smaller opening resulted in too high a temperature being produced by the vapour in the flask. The bronchitis kettle was later replaced by a flask of boiling water, part of the steam from which is directed through the opening into the humidifying chamber by a glass nozzle with an orifice 1 mm. in diameter. The steam passing through the nozzle is controlled by a screw clip on the rubber tube connecting it with the boiler. In order to protect bacteria from direct contact with hot steam the nozzle should be screened by a conical shield of some poorly conducting material such as Cellophane. In the experiments to be described this was not done. The amount of steam passing through the nozzle must be controlled so that during air-sampling the humidifying chamber is kept filled with a mist at a temperature not greater than 50° C. without any excess vapour drifting back through the entry orifice.

The upper part of the chamber tapers to an outlet ½ in. in diameter through which the mixture of air and mist is withdrawn and passed through a condenser system the extent of which depends on the rate of air sampling. In our experiments, two 10 in. double-surface condensers of the Liebig type connected in series were sufficient when air was sampled at the rate of 1/10 c. ft. per min. The effect of setting the outlet to the chamber at the apex of a cone is to produce stream-lining and even mixing of the air and water vapour as they are withdrawn.

The outlet from the condenser system is connected with a suction pump through a flow meter of the manometer type and a cotton-wool plug filter, which was introduced in order to test the degree of sterility achieved in the treatment of the air sample. Where low rates of air flow are used the suction pump might be replaced by an aspirator bottle containing a known volume of water by whose displacement air can be drawn through the humidifying chamber and condenser system.

RESULTS

The result of a single experiment is set out in the table. A number of additional experiments were carried out along the same lines and with similar results.

Ten c.cm. of an 18-hour broth culture of a readily identifiable serological type of salivary streptococci was sprayed into the upper air of a small room, 10 ft. long, 5 ft. wide and 10 ft. high. An ordinary De Vilbis throat spray was used, the atomisation produced being very coarse so that most of the culture fell immediately to the ground, on which it produced a visible wet film. A quarter of an hour elapsed between the end of spraying and the beginning of air sampling; during this period the apparatus was assembled on a bench in the room. The humidifying chamber was then filled with mist and air drawn through at the rate of 1/10 c. ft. per min. At the end of each of three 15 min. periods air sampling was discontinued, the steam cut off, the condensate which had collected in the humidifying chamber flushed out with a small quantity of sterile water and the cotton-wool filter replaced by a fresh one. These operations necessitated an interval of 10 min. between each 15 min. period of air sampling. Blood-agar plates 4½ in. in diameter were exposed for 15 min. periods at the level of, and 12 in. from, the entry to the humidifying chamber. A fresh plate was exposed at the beginning of each period of air sampling. At the end of the experiment the condensers and their connecting tubes were flushed out with sterile water and from each filter the cotton-wool plug was removed, teased out in 15 c.cm. of sterile broth and then taken into separate flasks of glucose broth. These, together with blood-agar pour plates incorporating known fractions of the chamber and condenser washings and the entire filter plug washings were incubated at 37° C. for 48 hours.

It will be seen from the table that there was a rapid fall in the number of colonies on the successive plates exposed to the air of the room during the experiment. This clearly shows the selectivity of the exposed plate in demonstrating large, rapidly falling, infected particles in the atmosphere. At the end of an hour from the time of spraying, the blood-agar plate showed no streptococcal colonies after 15 min. exposure, whereas the cloud chamber still demonstrated a fairly high degree of atmospheric pollution.

COMPARISON BETWEEN DEGREE OF AIR INFECTION DEMONSTRATED BY THE CLOUD-CHAMBER AND EXPOSED-PLATE METHODS IN AN ARTIFICIALLY INFECTED ATMOSPHERE

1½ c. ft. of air sampled between	No. of strep. colonies from cloud-chamber washings	Cotton-wool filter cultures after passage of air from cloud chamber (pour plates and glucose broth)	No. of strep. colonies on exposed plates
3 and 3.15 P.M.	3000	Sterile	++
3.25 and 3.40 P.M.	450	,,	110
3.50 and 4.5 P.M.	150	,,	0

++ Too many colonies to count accurately (approx. 2500).

Air spraying was begun at 2.40 P.M. and completed by 2.45 P.M.

Air sampling was begun at 3 P.M.

The washings from the first and second condensers yielded 50 and 30 streptococcal colonies, respectively. In addition to streptococci a few colonies of staphylococci and *Bacillus subtilis* grew in each of the pour plates, except those made from the filter-plug washings which were sterile.

DISCUSSION

Steaming is commonly employed for removing bacteria and dust from the air inside hoods under which manipulations requiring a high degree of sterility are sometimes performed. At one time this method of air sterilisation was used in operating-theatres, but it has now been largely discontinued owing to the excessive humidity produced. It has been observed that bacterial pollution of the outside atmosphere is specially large at the level of the lower cloud limits (Flemming [2]); this may in part be due to the removal of bacteria from rising air currents by cloud formation.

As a means of quantitative bacteriological air analysis the method described here has certain limitations, but they do not seem insurmountable. In our experiments only low rates of air sampling were used, and a direct relationship seems to exist between the necessary condenser space and the rate of air flow over it. Further, the apparatus used in these experiments, although simple, is not easily transportable and does not lend itself readily to use under crowded or difficult field conditions. Time and facilities were not available for devising a more portable form of apparatus. The

1. Wells, W. F. *Amer. J. publ. Hlth*, 1933, 23, 58.

2. Flemming, J. *Z. Hyg.* 1908, 58, 345.

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cloud chamber has certain advantages over the other methods in common use. Its efficiency in removing streptococci from the air appears to be high, judged by the sterility of treated air as demonstrated by cotton-wool filters. Theoretically, the efficiency does not depend wholly on particle size, and it should be possible by this method to isolate virus particles from the air. Finally, the organisms are recovered in a fluid medium; suitable dilutions can be put up for colony counts in selective media as indicated by the probable degree of atmospheric pollution and the particular organisms under investigation.

My thanks are due to Mr. T. C. Angus, D.Sc., of the London School of Hygiene, for the loan of an air pump and to Mr. E. J. D. Wilson for technical assistance.

GAS-GANGRENE OF THE EYE

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GAS-GANGRENE panophthalmitis is not common, though cases have been reported by Chaillous (1904, 1905), Darier (1905, 1906), Beneditti (1907), Schumaker (1908), Oreste (1910), James (1910a and b), Lutz (1910), Heath (1929), Ridley (1929), Hamilton (1930) Berry (1932) and Walker (1934, 1938). There seems to be no published record of any cases during the 1914–18 war, but details of one have been received in a personal communication from M. H. Whiting. Consideration of the published reports and the following 12 cases which have been treated during the past eleven years at the Royal London Ophthalmic Hospital enables the main features of the infection to be described.

TWELVE CASES

The patients were all male, ten being aged between 23 and 56, one aged 11, and one 64. All had received a perforating wound of the globe, and in seven of them this was associated with an intraocular foreign body. In other patients it was the result of injuries from such articles as pieces of stick, a stevedore's hook and the inner tube of a motor tyre. In no case had the perforation been received more than 24 hours previously. Panophthalmitis was already present in six patients when they were first seen, and the remainder developed the same condition within 24 hours of admission. Severe pain in the eye was a well-marked feature with brawny swelling of the lids as in orbital cellulitis. In two of the eyes bubbles of gas were seen in the anterior chamber. General manifestations were slight, though some cases, where there was delay in removal of the eye, showed signs of toxæmia without much rise of temperature.

The intraocular foreign body was removed from the seven patients where one was present, and in one recent injury a prolapse of the iris and ciliary body was abscised and a conjunctival flap stitched over the wound. These measures had no effect on the progress of the condition, and removal of the infected eye was performed in every case, in eleven by evisceration and in one by enucleation. Ten of the men were given anti-gas-gangrene serum. Recovery was rapid and uneventful in all, the socket healing without complication, and where signs of toxæmia were present these rapidly disappeared after the eye was removed. *Clostridium welchii* was isolated from all the eyes, and, in addition, *Staphylococcus albus* from two of them. The latter organism may be regarded as a contamination from the conjunctival sac.

ÆTIOLOGY AND PATHOLOGY

A perforating wound of the globe, penetrating the vitreous, is the route of infection in all cases, and in many an intraocular foreign body is present. No other anaerobic organism has been found, but *Staph. albus* was identified in two of my patients, and streptococci have appeared in some reported cases. The infecting organism has been thought to be present on the object causing the injury, but the variety of these and in some cases the apparent lack of contamination with soil, manure or other recognised sources of *Cl. welchii* suggests that the organism may sometimes be present in the conjunctival sac. Beneditti (1907) has described a case of gas-gangrene panophthalmitis where *Cl. welchii* had previously been isolated from a mucocele of the lacrimal sac, while Fava (quoted by Oreste 1910) has described the occurrence of the same organism on the lashes. Males are affected almost exclusively, because of the greater likelihood of their receiving perforating wounds of the globe in their work. In this series ten of the twelve patients fell within the usual age-limits of occupational diseases. There is no evidence to show that hæmorrhage, fatigue or a lowered general state of health bear any relation to the occurrence of the infection, nor does age seem to have any effect on incidence except by determining occupation.

The enucleated eyes show the changes usually found in panophthalmitis. The margins of the wound, anterior chamber, iris and ciliary body are densely infiltrated with polymorphonuclear leucocytes. The lens is similarly affected when its capsule has been injured. Many leucocytes are present in the vitreous and there is œdema, leucocytic infiltration, and destruction of the retina. *Cl. welchii* is present in the vitreous and inner layers of the retina, and Chaillous (1905) has emphasised that they avoid the zone close to the choroid, which may be expected to have a relatively high oxygen content.

CLINICAL MANIFESTATIONS AND TREATMENT

Acute panophthalmitis developing within 24 hours of a perforating injury of the globe and associated with severe pain is the characteristic clinical finding. General collapse and pallor may follow if treatment is delayed. A brown discharge from the wound may appear, occasionally containing small bubbles of gas. In the early stages an intraocular foreign body may be seen in the vitreous with a bubble of gas attached, and later gas appears in the anterior chamber.

Evisceration of the globe without opening the subconjunctival tissues is the treatment of choice, but enucleation has been performed with equal success. Anti-gas-gangrene serum has been given, but patients have recovered equally well when this has not been available. Recovery has been rapid and uneventful in all cases, and of those described here all left hospital within two weeks of the removal of the globe. In no reported case of gas-gangrene infection of the eye has the patient died from this cause. There is no record of the effect of the sulphonamides in this condition.

The course of gas-gangrene infection of the eye thus differs materially from that in other parts of the body; this may be traced to anatomical peculiarities. The factors which predispose to infection by gas-gangrene organisms are:

1. Inadequate drainage of deep wounds.
2. Presence of soluble calcium.
3. Presence of foreign bodies, devitalised tissue and blood-clot.
4. Impairment of circulation, as by tight bandaging.
5. Involvement of muscle in the wounds.

A perforating wound of the globe has no adequate drainage in many cases, and the vitreous, which is an inert substance without blood-vessels, contains soluble calcium. For these reasons the globe is a potential site of gas-gangrene infection. Elsewhere in the body the infection spreads in the tissue planes between muscle-fibres; lymphatic spread is slight, and invasion of the blood-stream is a late occurrence. No muscle tissue connects the interior of the globe with another part of the body, and it has no true lymphatics. The infection tends to remain localised until its severity becomes obvious, and eradication of this local infection prevents further spread.

SUMMARY

Twelve cases of gas-gangrene panophthalmitis following a perforating wound of the globe are described. Evisceration was performed in each case and recovery was rapid.

The panophthalmitis develops within 24 hours of the injury and is accompanied by severe pain but little general disturbance.

No deaths have been reported from this condition.

I should like to thank the members of the surgical staff of the Royal London Ophthalmic Hospital for permission to publish these cases, and Dr. S. H. Browning who carried out the bacteriological investigations.

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FORTY CASES TREATED AT THE ALLENDALE CURATIVE WORKSHOP

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REHABILITATION needs serious attention at present. An account of the first year of work at the Allendale Curative Workshop, opened at Clifton, Bristol, in 1939, is therefore of interest.

The premises consisted of a former hotel with large ground-floor rooms and nearly an acre of garden. Work had to be experimental, and each patient was made a special study. Among the personnel was Miss Mary Macdonald, member of the Association of Occupational Therapists, and head of the Dorset House School of Occupational Therapy. She had then lately returned from a tour of orthopædic hospital occupational therapy departments in America, having been given a research grant for this purpose by the Pilgrim Trust. Dr. Eugen Weissenberg, formerly in charge of the physiotherapy department at the university clinic, Vienna, joined us as a student. Miss K. Barber, another member of the A.O.T., and now in charge of occupational therapy at a Naval hospital, was also with us, and we had an enthusiastic teacher in Mr. R. C. Cole, who was an excellent joiner. Students of the Dorset House school engaged in their clinical practice with patients.

Weaving and light crafts were carried on in a room which measured about 19 ft. by 17 ft. and allowed space for 10 patients. Slightly heavier work, such as block printing and basket-making, was undertaken in a room (20 ft. by 15 ft.) which provided space for 9 patients. More strenuous work, such as joinery and metal work, was carried on in a long room (42 ft. by 15 ft.) where benches, a lathe, and bicycle and treadle saws were provided; some embossing presses which had been given to us were also in this room. The old dining-room (30 ft. by 20 ft.) was provided with a billiard table, and the conservatory gave room for darts.

The first 40 cases show what useful work can be accomplished. They came chiefly from fracture clinics at the hospitals, and were chosen by their surgeons because of some complication calling for special attention—joints fixed by adhesions, or bad habits of posture. No patient was taken without prescription and full instructions from his doctor; in the case of patients from the fracture clinic, the occupational therapist in charge attended regularly at the clinic when the orthopædic surgeon was re-examining the patient, and heard his fresh instructions. A report from the hospital almoner was also received on each case sent up. Treatment was given in the mornings only, but the whole day should be occupied if possible before the patient is discharged back to work.

CASE-HISTORIES

CASE 1.—A woman of 23 with arthrodesis of tuberculous hip. After operation she had developed a functional disease of the knee-joint. She was lacking in self-confidence and was too conscious of her disability. Her inability to sit at an ordinary table seemed the chief cause of her unhappiness and also her inability to return to her work as a shorthand-typist. She was taught to weave on a small loom with hand controls in order to interest her in the subject without referring to her leg. She was then promoted to a foot-power loom in which the warp was raised or lowered by flexing the knee-joint. While using the hand-loom she had become so keen on the texture and pattern of the material she was weaving that she was glad to perform the necessary movements, and was soon able to realise that her knee was quite capable of being bent to a more æsthetic posture. Her gait improved at the same time. She asked to stay on for a few weeks to finish the length of material she was weaving and then returned to her office work.

CASE 2.—A man of 53, suffering from the after-effects of acute infective polyneuritis. He had been completely paralysed for several months but had recovered sufficiently to walk, and by several trick movements he could feed himself. Treatment began with weaving a rug on a frame threaded with a warp of string. The patient's deltoid and exterior muscles were weak and could not bear the weight of his arms so his arms and hands were slung in canvas loops from brackets extended from the top of the frame. He had a spasmodic contraction of the shoulder muscles which relaxed when his arms were suspended. Improvement became evident in the first few days, since the patient enjoyed the work. The next stage was to support the wrists only on an adjustable slat placed across the frame, again leaving the fingers free to weave and to push the threads into place, thus getting active extension of the fingers and wrists. As the muscles improved in tone and strength, new crafts were prescribed, such as knotting dog leads, stool-seating and woodwork. The dart-board for a few minutes each day helped in the cure.

CASE 3.—A man, aged 61, who had had a compound fracture of the radius from a conveyor-belt accident. His shoulder had been strained, and he had arthritis of shoulder, elbow and wrist with much residual disability of shoulder, arm and forearm. Mental depression was pronounced. Treatment was first given in the form of easy weaving on small hand-loom; at this time the therapist was making friends with the patient and gaining his confidence. Later he made a warp on the "mill," encouraged by the knowledge that the warp was needed for another patient's work. An occupation had to be chosen that could be carried out at a level which gave easy abduction of the upper arm to begin with; this was increased gradually by raising the height of the mill without the patient noticing that he was doing more. As soon as he realised that his angle of abduction had increased his confidence was aroused and he then willingly coöperated in carrying out the changes in his work that increased the effort needed. His recovery was completed by getting him to sand-paper and paint screens raised to a level above his shoulder and to drill holes in a solitaire board, which exercised flexion and extension of wrist. Finally he did weaving on a large foot-loom which enabled him to get larger movements; easy supination was achieved by throwing and catching the shuttle.

CASE 4.—A left-handed man with compound fracture of left proximal phalanx of ring finger and simple fracture of little finger. Even passive extension of these fingers was impossible. Treatment was by joinery, which was his hobby; first he did planing with fingers extended as far as possible on the plane, and then sawing and generalised movement, with various tools, to ensure complete movement and suppleness. The patient was entirely coöperative and the fingers became almost normal.

DISCUSSION

These cases bring out the importance of the muscular spasm which often develops before treatment is begun. Without occupational therapy this is difficult to overcome because the patient has allowed the wrong posture to become a habit. Occupational therapy replaces in the patient's mind the image of a limb that he cannot use by one of a piece of work which that limb is accomplishing. Much depends on the atmosphere into which the new patient is introduced. Allendale was essentially a happy place where people felt they would get well. Each patient was welcomed and made to feel that his difficulties and disabilities were understood. His primitive impulses to investigate new surroundings, to show what he could perform, and to join in the activities of a group, all had to be stimulated; and when the appropriate emotion had been aroused the impulse was directed at once into an activity that helped his recovery. His fear and suspicion had to be circumvented. It usually took a few days to start a patient off well; many grasped the idea of what was intended in the first few minutes and became real enthusiasts in helping newcomers, but others needed much care to begin with; but once they realised that a change had begun in the injured limb, their coöperation could be relied upon. Special apparatus, designed by Dr. Weissenberg, was available to measure

MR. CROSS: REFERENCES

Beneditti, A. (1907) *Clin. oculist., Palermo*, **8**, 3013.
Berry, E. M. (1932) *Amer. J. Ophthal.* **15**, 1022.
Chaillous, J. (1904) *Rec. Ophthal.* 3rd series, **26**, 678.
— (1905) *Ann. Oculist., Paris*, **134**, 115.
Darier, A. (1905) *Clin. ophthal.* **11**, 266.
— (1906) *Ibid*, **12**, 283.
Hamilton, J. B. (1930) *Brit. J. Ophthal.* **14**, 452.
Heath, W. E. (1929) *Ibid*, **13**, 574.
James, R. R. (1910a) *Ophthal. Rev.* **29**, 161.
— (1910b) *Trans. ophthal. Soc. U.K.* **30**, 179.
Lutz, A. (1910) *Klin. Mbl. Augenheilk.* **10**, 31.
Oreste, A. (1910) *Ann. Oculist., Paris*, **143**, 35.
Ridley, F. (1929) *Trans. ophthal. Soc. U.K.* **49**, 221.
Schumaker, G. (1908) *Klin. Mbl. Augenheilk.* **140**, 303.
Walker, S. (1934) *J. Amer. med. Ass.* **102**, 156.
— (1938) *Arch. Ophthal., N.Y.* **19**, 406.

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the angle of movement, and the patient could thus see from an actual graph what improvement he had made.

Experience has taught the following rules:

1. The craft chosen must provide the exact muscle movement needed at each stage. It must be changed as the patient changes.

2. The occupational therapist must superintend the movements continually; she must, therefore, have a complete training in anatomy and physiology, such as is required for massage.

3. The patient's mind must be concentrated on the accomplishment of the work on which he is engaged. Therefore it must be something that he enjoys doing and knows to be useful.

4. The degree of strenuousness must be carefully regulated. Premature use of heavy tools can only do harm; and to continue light work too long may produce a dilettante habit, and delay a man's return to his own work. The equipment must, therefore, include apparatus for heavy sawing and hammering. Work should be increased until the patient is doing a full day's activity, which can include digging in the garden and pre-vocational work. Games are a valuable adjunct. A patient who thought he could not play billiards was seen to be acting as marker to the players; he walked round and lifted his arm to mark, unconsciously exceeding what he believed to be his capacity.

Fear of infringing the rules of insurance companies had to be overcome. Some patients thought that treatment might be counted as "work" and that it would reduce their compensation; this doubt was best removed by the surgeon in charge of the case. Only one man expressed fear of his trade union objecting, and asked "what the pay would be" for his work.

The cost is important. Only one of the first 40 cases was paid for by an insurance company. Nearly all were compensation cases and the money was just enough for the man to live on; most could not even afford their fares to the curative workshop. A small part of the cost has been covered by the Dorset House School of Occupational Therapy. It is hoped that in time insurance companies will realise that occupational therapy lessens and shortens disability and therefore reduces cost. Insurance companies in America pay for such treatment and even run their own rehabilitation centres for the injured workpeople whom they are compensating, because they know it pays them to do so. Insurance companies in England already pay for medical treatment, nursing and massage, and might well make wise expenditure on this great aid to recovery.

We have had to depend entirely on voluntary attendance, and it is difficult to ensure that the patient can be convinced in the first or second visit that it is worth while to persevere with treatment, perhaps at some considerable expense of energy and of money for fares. Those who are intelligent enough to grasp at once the principle involved become enthusiastic quickly and help newcomers to settle in. But while numbers are small those nearing recovery are few; and those who have recovered have gone. Definite instructions from the insurance companies paying compensation would help, at this stage, to ensure regular attendance and consequent success.

The injuries and disabilities treated included: fractures of humerus, radius and ulna, wrist, metacarpals, phalanges, scaphoid, os calcis and cervical spine; arthritis, arthrodesis and ankylosis of joints associated with such fractures; dislocation of the elbow; valgus deformity of the feet; chronic strains; pareses of musculospinal, median, ulnar and circumflex nerves; cerebral palsy; laceration of muscles and severed tendons after repair; limitation of movement after osteomyelitis of the carpus; tuberculous osteitis of hip and spine; acute infective polyneuritis; post-encephalitis; and traumatic neurosis. Results are summarised in the following table.

At the beginning of the war arrangements were made for the workshop to undertake treatment under the E.M.S.; but enemy action having made it inadvisable for patients to remain in Bristol the workshop was transferred elsewhere. Bristol patients are treated at Winford Hospital under Miss G. E. Barnes and Mr. R. C. Cole in the wards and in a special occupational therapy hut. The Dorset House School of Occupational Therapy has now been transferred to Barnsley Hall Emergency Hospital, Bromsgrove, where it is fortunate in being under the direction of Dr. Andrew Shepherd, the medical superintendent, who has paid special attention to occupational therapy in his hospital for many years. Active rehabilitation work is again in progress there, and with the backing of the Ministry of Health will be on a much larger scale than was possible at Allendale.

LENGTH OF TREATMENT AND ITS RESULTS IN 40 PATIENTS (32 MEN, 8 WOMEN) OF VARIOUS AGES

Age (years)	Cases	No. of treatments	Cases	Length of treatment (months)	Cases
10–19	2	Less than 5	6 | 13	1	9
20–29	5	5–9	7 /	2	15
30–39	4	10–19	9	3	4
40–49	5	20–29	6	4	4
50–59	10	30–39	5	5	1
60–69	8	40–49	3	6	..
70–79	1	50–59	4	7	2
Not given	5			8	1
				9	1
				Attended only once	3

Cured or much improved	25 cases
Slightly improved	7 ,,
Not improved	5 ,,
Only attended once	3 ,,
Total ..	40

SUMMARY

A report is given on the first 40 cases treated at the Allendale Curative Workshop, attached to the Dorset House School of Occupational Therapy, Clifton, Bristol; 4 cases are described fully.

The cost of rehabilitating patients by occupational therapy might well be borne by insurance companies, as it is in America; this would allow of extension of this valuable form of treatment.

I wish to thank Dr. E. Weissenberg and Miss E. M. Macdonald for their help in preparing this report, and to Dr. H. H. Carleton, Mr. K. H. Pridie, and Mr. A. L. Eyre-Brook for allowing me to report on their cases.

LOCATION OF FOREIGN BODIES BY A RADIO-FREQUENCY PROBE

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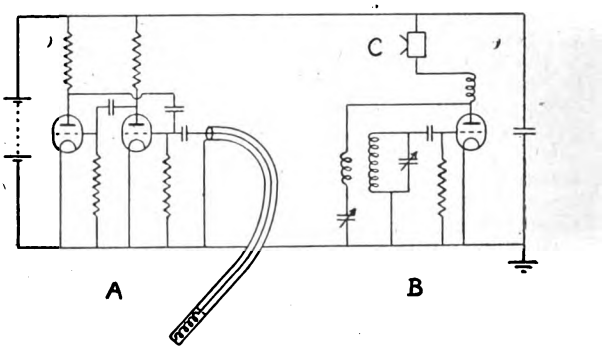
IN THE LANCET of May 31, 1941 (p. 699), mention was made of an instrument, described in a broadcast from Germany, for locating metallic particles embedded in the body. The device, which is intended to take the place of X rays in the operating-theatre, does not appear to have been used to any appreciable extent in this country.



An experimental set has been assembled at this hospital. The high-frequency oscillator (A in the diagram), working on a frequency of the order of 10^6 or 10^7 cycles per second, has the whole of its tuning inductance in the form of a search coil which can be moved about near the patient, and the second oscillator (B), working on a slightly different frequency, acts as a detector, and produces in the loudspeaker or telephone (C) a beat note

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equal to the difference between the two frequencies. When the search coil comes near a piece of metal its inductance falls slightly, and the resulting frequency change is at once noticed in the note from the apparatus.

The possible choice of radio-frequency is very wide: the highest values give the greatest sensitivity to metallic bodies, but their practicability is limited by the stability of the apparatus and by the increasing effect of dielectric materials in the vicinity of the search coil relative to the effect of the metal itself. A frequency of about 3×10^6 was found to be about the optimum. Using this frequency, the apparatus will indicate the presence of a sixpenny piece at a distance of half an inch, and particles down to the size of a small pin closer to the search coil. Larger bodies may be detected at slightly greater distances. It does not seem possible to extend the effective range of an instrument working on this principle much beyond these values.

The instrument is likely to be of value, in conjunction with X-ray examinations, for indicating the approximate position of metallic substances, in particular for assisting the surgeon while operating. It cannot, it seems, be regarded as comparable in value with X-ray methods, by which the number and size of the particles are shown as well as their precise positions within the tissues.

PULMONARY TUBERCULOSIS IN THE SERVICES

SURVEY OF 100 CASES

JOHN ASPIN, M.B. CAMB. RANDAL STALKER, M.B. EDIN.

LATELY ASSISTANT MEDICAL OFFICERS AT A SANATORIUM

A SURVEY has been made of 100 soldiers and airmen suspected of having pulmonary tuberculosis who were sent directly to one sanatorium from military hospitals and sick posts. The cases were admitted without selection in the order of application for beds. Usually they came three or four weeks after the diagnosis had been made. There were all types of soldiers, in all stages of the disease. Some seemed comparatively healthy, some were evidently moribund. We believe that this series of 100 consecutive admissions between June and December, 1940, is likely to be representative of the incidence of pulmonary tuberculosis in the Army and R.A.F. at that time.

Eight men were finally regarded as non-tuberculous, and were diagnosed as follows:

Chronic bronchitis	2
Postpneumonic effusion	1
Postpneumonic fibrosis	1
Pleurisy (no tuberculous basis found)	1
Lung abscess	1
Effort syndrome	1
Congenital cystic disease of lung	1

The case of congenital cystic disease had received sanatorium treatment for tuberculosis at the age of seven. After four weeks' military service (he had been a chef in civil life) he broke down with malaise, pleurisy and heavy staining. Lipiodol bronchography performed at the sanatorium by Dr. J. W. Seymour revealed that he was a typical case of generalised congenital cystic disease of the lung.

RECRUITMENT OF KNOWN CASES

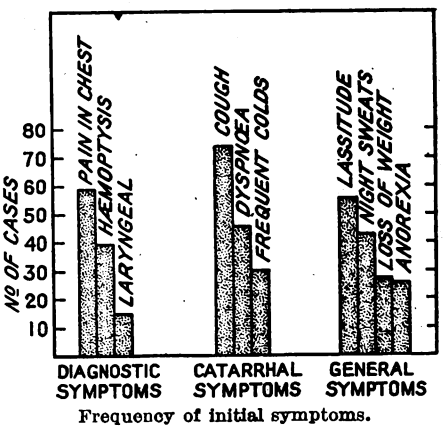
The series, which contains a proportion of men who enlisted before the Public Health (Tuberculosis) Regulations, 1940, came into force, includes 10 previously notified cases of tuberculosis, 6 of whom had been in sanatoria. There were 4 men considered to have active pulmonary lesions at enlistment; one of these, who had previously refused institutional treatment, was invalided after his tuberculosis officer had communicated with the military authorities. An arrested case whose history has been published (Aspin 1940) had been discharged from the Army in February, 1940, after a breakdown. Before June in the same year not only had he contrived to re-enlist in another regiment but he had broken down and had been invalided for a second time. At the time of enlistment 3 other men had quiescent pulmonary lesions, while 2 who were previously non-pulmonary cases broke down in the Service with pulmonary lesions.

Most of these men had concealed some essential part of their history when they came before medical boards, and one or two had deliberately made false statements. Although one man admitted that he had joined up to get a "soft job," and revealed a previous history of sanatorium treatment when he found himself on the parade-ground, the others gave us the impression that they felt they were helping their country when they enlisted. Under the Public Health (Tuberculosis) Regulations, 1940, the medical boards who examine recruits are now made acquainted, as far as possible, with the previous history of examinees whose names are on the tuberculosis registers. In addition, the Ministry of Labour now asks every examinee before a medical board to sign a declaration that he has not at any time suffered from tuberculosis. In this way the future recruitment of known cases of tuberculosis should largely be avoided. The need for such measures is shown in a series published by Kersley (1941) who, in the first 100 men that he examined and boarded out of the Army, found clear evidence that 18 had been in sanatoria and that 15 more had been suffering from the disease before enlistment.

MODE OF ONSET

In about two-thirds of our cases the onset was gradual. Several symptoms had usually appeared before the soldier reported sick. In the remainder the onset was more abrupt and indeed often dramatic; 9 men reported sick after a considerable hæmoptysis, which in 6 had happened while on duty. One man was digging in a deep trench when suddenly he developed a spontaneous pneumothorax. There were 18 cases of pleurisy with effusion in which sudden severe pain was the presenting symptom. Of these men, 10 were well and gave no symptoms or signs of chest trouble until the day the pain began. In these 10 cases fluid was demonstrated 4–25 days after the onset of the pain.

Examination of the symptoms present when the men reported sick showed that there were only 20 cases in which there had not been pain in the chest, hæmoptysis or staining; 59 men said they had pain in the chest; 39 had coughed up blood or blood-stained sputum; 18 reported both pain in the chest and hæmoptysis. The symptoms present at onset are shown in the figure.



Frequency of initial symptoms.

In 7 cases the diagnosis was made while they were under investigation in hospital for apparently unconnected conditions—hernia, error of refraction, gastritis, mastoid infection, wounds, dysentery and acute encephalomyelitis; 2 men complaining primarily of hoarseness were diagnosed as tuberculous by ear, nose and throat specialists to whom they were referred.

A history of considerable distress during physical training was given by 24 men; of these, 14 had to do harder physical work since joining up. Of the 76 men who felt no undue distress during physical training 21 had to do harder physical work. While the disease was more advanced in cases showing distress during physical training, previous occupation seemed to influence the degree of dyspnœa experienced. It is evident that a labourer would not complain of breathlessness after exertion that might be troublesome to a sedentary worker.

NATURE OF LESIONS AND STAGE OF DISEASE

Obviously abnormal physical signs in the chest were present in 48 cases and clubbing of the finger-nails in 15.

In 46 men the lesions were unilateral, while 53 showed bilateral disease. Cavitation was present in 40 cases,

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including 14 in which one lung was only involved. There were 18 cases with pleural effusion, in 11 of which underlying shadowing was visible; 1 of the simple effusions was regarded as non-tuberculous. Definite signs of fibrosis, as shown by displacement of the heart or trachea, or thickening of interlobar septa, were found in the radiograms of 14 cases, while 20 more showed less obvious evidence of contracting lesions. In 13 cases there was definite calcification, and in 8 of these the calcified areas were well outside the hilar regions.

When the original diagnosis had been confirmed, 92 cases remained. These were arranged according to the classification of the Ministry of Health into class TB minus (sputum negative or absent); class TB plus (sputum positive) groups I, II and III (early, moderate and advanced cases). The proportions were found to be: TB minus, 35·9%; TB plus group I, 11·9%; group II, 41·3%; and group III, 10·9%. To compare these figures with those from an area with a highly developed tuberculosis scheme, the numbers of new patients with pulmonary disease applying for treatment during 1936, 1937 and 1938 were obtained from Dr. G. Lissant Cox, central tuberculosis officer for Lancashire. The 9 men, who were actually on the register at the time of enlistment, were removed from the series of Service cases, and the 83 remaining new cases compared with the new cases applying for treatment under the Lancashire scheme.

TABLE I—STAGE OF DISEASE IN SERVICE CASES AND IN NEW CASES APPLYING FOR TREATMENT IN LANCASHIRE

Stage	No. of cases		Percentage	
	Lancashire	Service	Lancashire	Service
TB minus	1209	33	35·5	39·8
TB plus group I	271	8	8	9·6
TB plus group II ..	1473	33	43·3	39·8
TB plus group III ..	451	9	13·2	10·8
Totals	3404	83	100	100

These two sets of figures show considerable similarity. A casual inspection might suggest that the Service cases were slightly less advanced, but in such a small series the differences might easily be expected as a sampling error. It is concluded that in these soldiers and airmen pulmonary tuberculosis was diagnosed while the disease was no more advanced than it would have been in new cases applying for treatment under the Lancashire scheme.

PAST HISTORY AND DURATION OF SERVICE

Kayne (1940), in a survey of 134 cases, found that the main criteria adopted by medical boards in selecting cases for special examination were statements of tuberculosis in the family, "pleurisy" in the past, or admission to a sanatorium or attendance at a tuberculosis clinic in childhood or adolescence. Since in his series he found only 2 men with active tuberculosis and 1 with recently active tuberculosis, Kayne concluded that histories of tuberculosis in family and pleurisy in the past as given by the recruit cannot be relied on to detect more than a small fraction of recruits with either active or healed pulmonary lesions.

In the present series 18 out of 92 cases of tuberculosis gave a history of a parent, brother or sister either being treated for pulmonary tuberculosis or dying with the disease; 5 of these cases and 10 others gave a history of hæmoptysis or pain in the chest with pyrexia before enlistment. These figures suggest that in Kayne's series the lack of positive findings may have been due to unreliable statements and the concealment of relevant facts by the recruits themselves. This unreliability has been confirmed in our series by the enlistment of known cases of tuberculosis. Others who wished to be discharged from the Army because they had been worried about their health freely confessed that they had made false statements, or had withheld essential information, when they were examined by the medical recruitment board.

Three-quarters of these men were conscripts whose military service amounted to less than a year. Individual service, however, varied over a wide range. A Q.M.S. had been 24 years with the colours. An "AC2" had 5 days' service to his credit. While 4 old regulars could muster 64 years' service among them, 12 others could not together make up six months' service (table II).

TABLE II—DURATION OF SERVICE

—	Less than 1 month	1–3 months	3–6 months	6–12 months	1–2 years	More than 2 years
No. of cases	16	18	19	23	14	10

DISCUSSION

Tuberculosis among men who served in the last war gave rise to serious problems even in the postwar years, and pensions for tuberculosis accepted by the state as "directly attributable to, or seriously aggravated by" military service continued to be given for many years after the war was over. Mitchell and Smith (1931a) state that 65,370 such pensions were awarded up to March, 1929, representing 7·6% of the total pensioned disabilities up to that time. Positive sputum was then the chief criterion for the diagnosis of pulmonary tuberculosis (Joint Tuberculosis Council Report 1939). Although the wastage in man-power from tuberculosis during the last war was negligible (Mitchell and Smith 1931b), many men suffering from pulmonary tuberculosis were returned to duty, with a consequent risk of infecting their comrades. Thus, from 1916 onwards 21% of the cases arising in the British Army were returned to duty (Mitchell and Smith 1931c).

The problems presented in this war by tuberculosis arising in the armed forces seem likely to be less acute. The death-rate from pulmonary tuberculosis has fallen steadily, and is now less than half what it was in 1918. Enlistment of known cases of tuberculosis, so common in the early stages of the last war, will be largely prevented by the new regulations. The risk of contact infection is further diminished because men diagnosed as tuberculous are now returned to duty only in exceptional circumstances. All examinees before medical boards suspected of being tuberculous are at once referred to the tuberculosis officers for special examination. Our figures show that in one small series at least tuberculosis arising in soldiers and airmen was diagnosed as soon as it would have been among civilians and that more than a third of these men were negative cases. Cases discovered in the Services are sent to special hospitals where full treatment is started at once, and when they are discharged from the Services, this treatment is continued by their local authority. At least one tuberculosis colony, the Papworth Village Settlement, is already offering the benefits of colonisation to suitable cases invalided from the Services.

These real advances are not enough to prevent the recruitment of men likely to break down with active pulmonary tuberculosis within a few months of joining the Services. In our series, out of 92 men, active lesions had been found within three months of enlistment in 29 cases (31·5%) and within six months in 48 cases (52%). These figures are less disturbing if it is remembered that mass radiography, whenever it has been performed on symptom-free people, has revealed active tuberculous lesions in 0·5–5% of them. Heaf (1940) has discussed the value of mass radiography in peace-time in combating the spread of infection by revealing the hidden active cases among the apparently healthy population. Even when men have previously been examined clinically, mass radiography has demonstrated some, though fewer, unsuspected active lesions. Berner (1939) in 10,852 picked storm-troopers who had been screened, found 0·8% of such cases. Among 9000 recruits from the Australian Imperial Forces, Cooper (1939) discovered 0·55% of active cases, and Galbraith (1941), in a later report, states that out of more than 100,000 such recruits 0·56% showed radiological evidence of active pulmonary tuberculosis. Sheldon Dudley (1941), reporting the results of mass radiography in the Royal Navy, where screen-photography is now performed as a routine, found an incidence of 0·32% active cases of pulmonary tuberculosis in 11,000 new entrants.

Kayne (1940) holds that without routine radiological examination the detection of unsuspected pulmonary tuberculosis in recruits is impossible. If the administrative and technical problems be overcome, there seems to be a strong case for the extension to the Army and

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R.A.F. of mass radiography by screen-photography using 35 mm. cinema film. The position has been ably summarised by Bentley and Leitner (1940):—

"It is not suggested that screen-photography will abolish tuberculosis from the Services, but it would eliminate a sensible proportion of tuberculous subjects who should not be allowed to serve. It is thought the saving in pensions alone would more than outweigh the cost of the investigation."

Probably many men in our series were unsuspected cases of tuberculosis when they joined up, and we have tried to find out how many would have shown radiological lesions visible by miniature radiography at the time of enlistment.

No-one would deny the difficulty, and some would question the possibility, of estimating the radiological appearances some time before a radiogram was taken. We were guided by duration of service, extent and density of the lesions, presence of cavitation, and clinical course of the disease. When a man had served for longer than six months, especial attention was given to definite signs of a contracting lesion, presence of hard shadowing or calcification in the lung fields, and previous history suggestive of tuberculosis. The cases have accordingly been divided into two groups—those in which miniature radiography at enlistment would, in our opinion, have revealed lesions suggestive of pulmonary tuberculosis, and others in which miniature radiography would have given no help (table III).

TABLE III—SERVICE CASES IN WHICH MINIATURE RADIOGRAPHY AT ENLISTMENT WOULD PROBABLY HAVE REVEALED LESIONS SUGGESTIVE OF TUBERCULOSIS

Period of service (in months)	No. of cases	Estimated result of M.R.	
		No help	Suggestive lesions
Less than 1	16	5	11
1– 3	18	5	13
3– 6	19	7	12
6–12	23	15	8
12–15	11	9	2
More than 15	13	13	0
Total	100	54	46

We estimated that in 46 cases abnormal shadowing or displacement of the mediastinum would have been clear enough at enlistment to have been detected by miniature radiography, though careful physical examination and history-taking had revealed no evidence of tuberculosis.

SUMMARY

A survey has been made of 100 Service men suspected of having pulmonary tuberculosis. The stage at which the disease was diagnosed in these men did not differ materially from the stage at which cases are diagnosed in civil life.

Reasons are given for the belief that in this war spread of disease by infection in the Services is likely to lead to fewer cases of pulmonary tuberculosis than in 1914–18.

In this series active pulmonary tuberculosis was found within three months of enlistment in 29 cases, and within six months in 48 cases.

Miniature radiography at enlistment would probably have revealed definite lesions in 46 of our cases.

We wish to thank Dr. J. W. Seymour, late acting medical director of the sanatorium, for permission to report these cases and for advice; Dr. G. Lissant Cox, who allowed us to quote figures from his annual reports; and Dr. George Jessel, who first suggested this survey.

REFERENCES

Aspin, J. (1940) *Brit. med. J.* **2**, 470.
Bentley, F. J. and Leitner, Z. A. (1940) *Brit. med. J.* **1**, 882.
Berner, F. (1939) *Roentgenpraxis*, **2**, 65.
Cooper, E. L. (1939) *Brit. med. J.* **2**, 247.
Dudley, S. F. (1941) *Lancet*, **1**, 481.
Galbraith, D. (1941) *Brit. med. J.* **1**, 700.
Heaf, F. (1940) *Lancet*, **2**, 611.
Joint Tuberculosis Council Report (1939) The Organisation of Tuberculosis Services in Time of War.
Kayne, G. G. (1940) *Lancet*, **2**, 518.
Kersley, G. D. (1941) *Brit. med. J.* **1**, 441.
Mitchell, T. J. and Smith, G. M. (1931a) Official Medical History of the War, Casualties and Medical Statistics, London.
— — (1931b) *Ibid*, p. 70.
— — (1931c) *Ibid*, p. 304.

ANTERIOR DISLOCATION OF RADIAL HEAD WITH FRACTURE OF SHAFT OF ULNA

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ASSISTANT ORTHOPÆDIC SURGEON TO THE ROYAL SOUTHERN HOSPITAL, LIVERPOOL; ORTHOPÆDIC SURGEON TO THE BIRKENHEAD GENERAL HOSPITAL

It cannot be said that anterior dislocation of the head of the radius with fracture of the shaft of the ulna has suffered in the past from lack of attention or investigation. The lesion is relatively rare, but recorded cases show that it has attracted notice since the beginning of the last century, when it was first described by Monteggia who recognised it without the aid of X rays. I record here 4 new cases illustrating the successive points emphasised by various authors during the last ten years.

It has been taught for some time that where there is a fracture of the shaft of the ulna with displacement the elbow-joint should always be included in the radiogram, because shortening of the ulna necessarily means the disruption of one or the other radio-ulnar joints, usually the superior one (Campbell 1929, Corbett 1931, Wilson 1933). Cases 2 and 3, reported here, however, showed subluxation of the head of the radius with only an incomplete fracture of the shaft of the ulna, unaccompanied by any displacement; so that it seems important always to examine the elbow-joint both with the fingers and by means of X rays.

Several writers have paid great attention to the exact mechanism causing the injury, but it seems to me more important to recognise that this dislocation of the radial head can only take place as a result of disruption of the orbicular ligament. Hunt (1939) and Campbell (1929) both describe this ligamentous tear, as do several later observers, but the standard textbooks of fractures (e.g. Scudder 1926, Sinclair 1931) made no mention of it until it was referred to by Kellogg Speed (1935) and Böhler (1935). Wilson (1938) gave a complete description of the pathology. My own observations have confirmed the ligamentous tearing in each case, and I have particularly noted that the torn ends were always retracted deep to the radial head and that, at the ulnar attachment, the ligamentous strands were so short and torn as to be useless for reconstruction.

CASE-HISTORIES

CASE 1.—Age 13. Fell on the right elbow in November, 1938. X-ray report of forward and outward dislocation of the head of the radius and fracture of the ulna. The dislocation was replaced manually, but the reduction was not stable. At open operation on Dec. 6 the ordinary external lateral approach to the head of the radius was used, but it was difficult to reach the front and inner side of the head. The torn edges of the orbicular ligament were demonstrated and an attempt made to suture them. The radial head dislocated for the second time a few weeks later, but despite the deformity the functional result was good and by April, 1939, there was full range of elbow movement and the

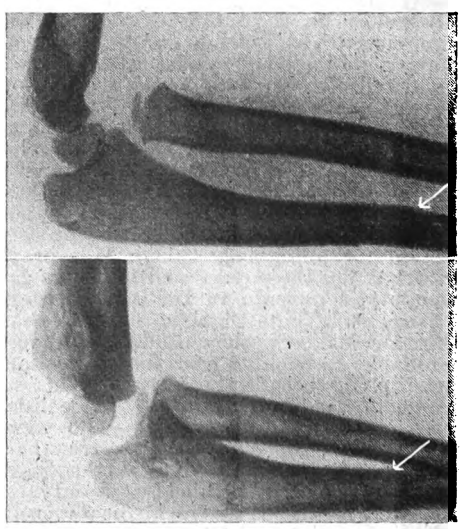

FIG. 3—Case 4. (*a*) Lateral view of elbow showing dislocation of head of radius. (*b*) Lateral view of elbow showing stable reduction of dislocated radial head after reconstruction of orbicular ligament.

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joint appeared to cause the patient no trouble.

CASE 2.—Age 10. Accident on Aug. 8, 1939. Radiography revealed an anterior dislocation of the head of the radius accompanied by an incomplete fracture of the ulna without any displacement. Again the head of the radius was easily replaced by manual reduction under anæsthesia, but as in case 1 the dislocation recurred readily. At operation on Aug. 16 an anterior incision at the outer side of the antecubital fossa was used; it was particularly noted that access to the head and neck of the radius was much easier and was obtained by retracting supinator longus outwards and brachialis anticus inwards. In this case also the torn ends of the orbicular ligament were found curled up deep to the radial head, but even with the better approach attempts at suturing the ligamentous remains were unsuccessful. X rays showed that the dislocation recurred.

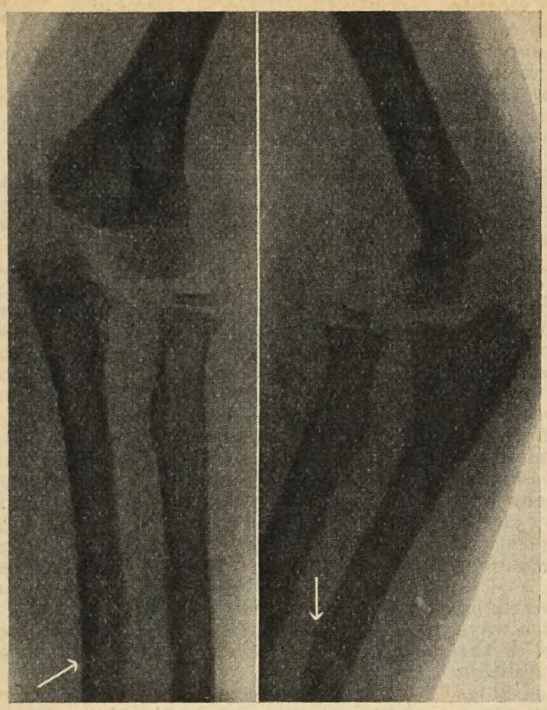

FIG. 1—Case 3. Anterior and lateral views of elbow showing dislocation of head of radius and fracture of shaft of ulna. Arrows in figs. 1, 2, 3 indicate site of fracture of ulna.

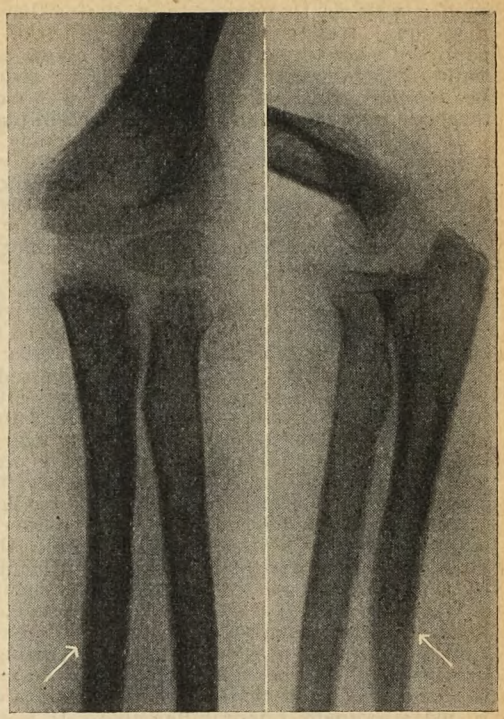

FIG. 2—Case 3. Anterior and lateral views of elbow after reconstruction of orbicular ligament.

CASE 3.—Age 7. Fell on the right arm in June, 1940, and sustained a fracture of the middle of the shaft of the ulna, with anterior dislocation of the head of the radius (fig. 1). At operation on June 18 the anterior approach was used and the torn orbicular ligament was easily demonstrated. The operation described below was carried out. The elbow was immobilised for 4 weeks and then active movement was allowed. After 4 months the patient had a full range of movement, and X rays showed that reduction of the dislocation was stable (fig. 2).

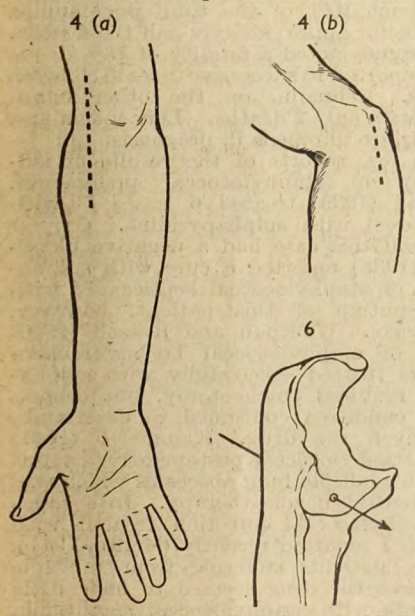

FIG. 4—Right arm. (*a*) Anterior cubital incision. (*b*) Incision on inner side of elbow parallel to posterior border of ulna.
FIG. 6—Head of ulna showing bore-hole.

CASE 4.—Age 14. Accident on July 31, 1940. Dislocation of the head of the radius. Manual reduction was easy but dislocation of the radial head recurred in plaster (fig. 3*a*). Operation as in case 3 was carried out. After 3 weeks' immobilisation the plaster was discarded and a month after that the child had a full range in the elbow and the joint has remained normal since. Fig. 3*b* illustrates the stability of the reconstructed orbicular ligament.

OPERATION

The anterior incision (fig. 4*a*), used in the cases I have described here, was made to the outer side of the antecubital fossa, according to the directions given by Campbell, Corbett and Wilson. In the upper part of the incision the gap between supinator longus on the outer side and brachialis anticus and biceps on the inner side was defined, and these muscles were retracted, the posterior interosseus nerve going with supinator longus. This line of cleavage was carried downwards so that the head of the radius and the inner and upper border of supinator brevis came into view. Small deep retractors were then inserted and the head and neck of the radius, with the torn ends of the orbicular ligament, were defined (fig. 5). A second incision was then made at the inner side of the elbow parallel with the posterior border of the ulna (fig. 4*b*). The ulnar nerve was defined as it comes out of the postcondylar groove and retracted posteriorly, so that the inner surface of the olecranon was available. At the level of the superior radio-ulnar joint a drill hole was then made through the base of the olecranon process, emerging at the lesser sigmoid cavity of the ulna (fig. 6). A loop of kangaroo tendon was then passed around the neck of the radius and both ends threaded through the eye of an aneurysm needle which was passed along the drill channel in the ulna to emerge in the superior radio-ulnar joint. The two ends of kangaroo tendon were then brought out at the inner surface of the ulna and knotted in

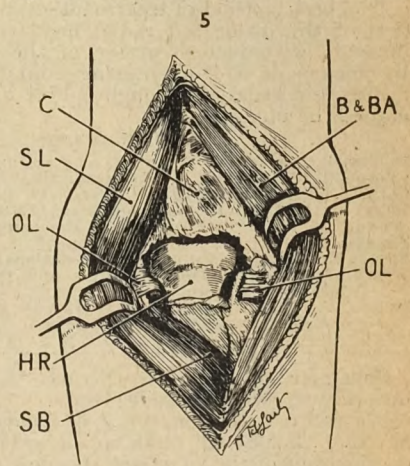

FIG. 5—Operation. C = capitellum covered by capsular ligament; SL = supinator longus; SB = supinator brevis; B and BA = biceps and brachialis anticus; OL = torn ends of orbicular ligament; HR = head of radius.

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such a way as to prevent any sliding back. As this manœuvre was carried out the head of the radius could be seen to reduce into both elbow and superior radio-ulnar joints and the stability of the reduction could be demonstrated before the wound was closed. Both incisions were closed and the arm fixed in plaster.

If the importance of the torn orbicular ligament is admitted, rational treatment will obviously aim at its reconstruction. It is remarkable that although Campbell (1929) advised and carried out the procedure here described, books on fractures show a division of opinion about what should be done. Böhler (1935) says that the dislocation is reduced by traction on the forearm with pressure on the head of the radius, and that if this is done early the orbicular ligament will heal and perfect function be restored. Kellogg Speed (1935) notes that reduction is difficult and mentions restoration of the orbicular ligament by a fascial graft passed through a hole drilled in the ulna. Watson-Jones (1940) recommends reduction as described in Böhler's textbook but advises reconstruction of the orbicular ligament in late cases where the fracture of the ulna is malunited or non-united. Wilson (1938) emphasises that in all cases there is a rupture of the orbicular ligament and states that while dislocation is easily reduced by closed manipulation it is impossible to retain the position. He recommends reconstruction of the orbicular ligament by a fascial sling passed through the ulna.

In my experience, though it is easy to replace the radial head by closed manipulation, the displacement always recurs. The reason seems to be the curling up of the ligamentous ends beneath the radial head; in addition the orbicular ligament is usually so much damaged as to make primary repair impossible. It is also evident that the degree of pressure which has necessarily to be kept on the head of the radius while the elbow is fixed in plaster is not safe. Even those surgeons who agree that reconstruction of the orbicular ligament is the only sound method of obtaining success in these cases, differ considerably about the way to achieve it. Hunt's suggestion (1939) of simple suture of the torn ends seems to be a counsel of perfection rarely possible to follow. The same objection holds for Corbett's method of plastic repair with a strip of bicipital fascia; there is not enough of the torn orbicular ligament left, particularly in a small child, for adequate fixation of the repairing strip. Campbell, Wilson and Kellogg Speed all carry out their reconstruction by drilling a hole through the upper end of the ulna. The results in my cases 3 and 4 illustrate the success of this method, and it is probably of little importance what material is used for constructing the new orbicular ligament.

SUMMARY

Four cases of anterior dislocation of the head of the radius, associated with fracture of the shaft of the ulna, are reported.

The best method of treatment seems to be open reduction of the dislocated radial head through an anterior incision, with reconstruction of the orbicular ligament by means of a loop passing round the neck of the radius and secured through a hole drilled in the upper end of the ulna.

REFERENCES

Böhler, L. (1935) The Treatment of Fractures, Bristol.
Campbell, W. C. (1929) *J. Amer. med. Ass.* **92**, 122.
Corbett, C. H. (1931–32) *Brit. J. Surg.* **19**, 155.
Hunt, G. H. (1939) *J. Amer. med. Ass.* **112**, 1241.
Scudder, C. L. (1926) Treatment of Fractures, London.
Sinclair, M. (1931) Fractures, London.
Speed, K. (1935) Fractures and Dislocations, London.
Watson-Jones, R. (1940) Fractures and Other Bone and Joint Injuries, Edinburgh.
Wilson, P. D. (1933) *Surg. Gynec. Obstet.* **56**, 335.
— (1938) Management of Fractures and Dislocations, London.

SOCIALIST MEDICAL ASSOCIATION.—A conference on the historical aspects of the medical services will be held at 12, Great Newport Street, London, W.C.2, on Sunday, Nov. 2, at 11 A.M. Mr. H. L. Beales will speak on the social background of the development of the voluntary hospitals in the 18th century, and Dr. T. O. Garland on health problems of the early days of industrialisation. In the afternoon Mr. Arnold Sorsby will open a discussion on the development of organised medicine. Further information may be had from the secretary of the association, 33, Murray Road, Northwood, Middlesex.

SULPHATHIAZOLE IN STAPHYLOCOCCAL LUNG INFECTIONS

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STAPHYLOCOCCAL infection of the lungs is well recognised as a complication of staphylococcal septicæmia and pyæmia. Staphylococcal pneumonia may however have a bronchogenic origin and such cases have particularly been observed during influenzal epidemics (Chickering and Park 1919). In influenzal patients the staphylococcus plays the part of a secondary invader, either alone or in combination with other organisms. Apart from these epidemics, staphylococcal pneumonia does not appear to be common, though occasional reports of its occurrence, particularly in children but also in adults, have been published (Reimann 1933, Macgregor 1936, Everley Jones 1938, Kanof et al. 1939). It is particularly liable to arise in patients whose resistance has been lowered by debilitating conditions.

The pathological features of staphylococcal pneumonia are the development in one or both lungs of one or more areas of massive consolidation showing hæmorrhage and early abscess formation. These abscesses are often multiple. *Staphylococcus pyogenes* can be cultured as the predominant organism from the lungs. Clinically the disease is often characterised by an insidious onset, but it may begin suddenly with chills and rigors. Associated upper respiratory infections are common. Pleuritic pain sometimes occurs. Fever is often high and remittent, with tachycardia, dyspnœa and cyanosis. There is often severe prostration, particularly in children and in influenzal patients. Diarrhœa appears commonly in infants. At first the physical signs are those of bronchopneumonia. Evidence of consolidation may soon develop over one or more lobes. Later the clinical features of lung abscess may manifest themselves. The sputum is purulent and may be bloodstained or rusty and in influenzal cases is sometimes salmon pink. It contains staphylococci, either alone or as the predominant organisms, and is often copious when abscesses have developed. If the patient does not die in the first few days of his illness an empyema commonly develops. Staphylococcal pericarditis and acute nephritis are occasional complications. The disease often lasts as long as a month in cases which recover. The fatality is high, particularly in influenzal and debilitated cases and in children. Thus it was noted by Chickering in the 1918 epidemic that though the staphylococcal cases constituted only about 10% of the total pneumonias they were responsible for approximately half the deaths. Kanof and his colleagues noted a fatality of 73% in his series. Macgregor reported 10 successive cases in children with no recoveries. Reimann, on the other hand, reported 6 patients with only 2 deaths. Leucopenia and high, sustained fever are ill omens in prognosis.

There have been few reports of the results of sulphonamide therapy in staphylococcal pneumonia. Blake and Haviland (1939) treated 6 cases (3 with positive blood-cultures) with sulphapyridine. Only 1 patient recovered and this case had a negative blood-culture. Maxwell (1938) reported a cure with sulphapyridine in a case of staphylococcal septicæmia with pneumonia. The sputum of this patient, however, contained pneumococci. Weisman and Russell (1940) described 5 cases of staphylococcal laryngotracheobronchitis in infants treated successfully with sulphamethylthiazole; 3 required tracheotomy, but despite this measure their condition continued to deteriorate until they were given the drug. Kammerer (1941) mentions a case of staphylococcal postoperative aspiration pneumonia with multiple lung abscesses which was cured after sulphamethylthiazole therapy. In a series of 50 cases of staphylococcal infection treated with sulphathiazole which I reported recently (Melton 1941), I observed that in patients suffering from multiple pyæmic lung abscesses the drug seemed to have little effect, but 4 patients with staphylococcal septicæmia developed pulmonary complications which cleared up satisfactorily. The present report concerns 4 other patients with staphylococcal pulmonary infections, 3 of

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bronchogenic origin, who were treated with sulphathiazole.

CASE-REPORTS

CASE 1.—Man of 59. Pneumonia complicated by lung abscesses and empyema. Admitted Feb. 2, 1941, on 4th day of disease, very ill with high fever, dyspnœa and cyanosis. Consolidation in upper- and mid-zones left lung. From 4th to 14th day sulphapyridine, 55 g., given by mouth. Pyrexia less for 2 days only. Consolidation developed in right mid-zone. Between 14th and 17th day pyrexia continued and radiography revealed cavity in left mid-zone. Sputum (8–12 oz. daily) showed predominating growth of *Staph. aureus* as well as some *Streptococcus hæmolyticus*. From 17th to 23rd day sulphathiazole, 36 g., given by mouth; apyrexial after 48 hours and showing much clinical improvement. Right lung cleared satisfactorily, but abscess persisted in left lung. From 28th to 30th day there was further pyrexia reduced by sulphathiazole. Aspiration of sterile, turbid, serous effusion from left pleural cavity carried out on 43rd and 49th days. On 61st day recurrence of pyrexia with acute nephritis. Left pleural effusion now found to give good growth of *Staph. aureus* and moderate growth of *Strep. hæmolyticus*. Blood-urea, 47 mg. per 100 c.cm. After another course of sulphathiazole, patient became apyrexial after 3 days and nephritis cleared up after 5 days. Empyema persisted and intercostal drainage instituted on 66th day. Sulphathiazole concentration in pleural fluid was 8·6 mg. per 100 c.cm. and in blood 15·5 mg. per 100 c.cm. Although dyspnœa and tachycardia improved considerably, empyema cavity remained large and on 94th day rib-resection was done under local anæsthesia and drainage begun. Patient then made a good recovery, empyema cavity closing in and lung abscess no longer being visible radiologically.

CASE 2.—Woman of 62. Staphylococcal pneumonia. Admitted Jan. 31, 1941, on 7th day of illness. Toxic, with consolidation of left lower lobe. From 7th to 15th day sulphapyridine, 48 g., given by mouth. Temperature fell slightly at first but soon rose to higher than before and lung signs persisted. Copious purulent sputum gave good growth of *Staph. aureus*. From 15th to 22nd day sulphathiazole, 80 g., given by mouth. Apyrexial after 4 days; fever recurred on 21st day and 2 oz. of sterile turbid fluid aspirated from left pleural cavity. Permanently apyrexial after 23rd day and lung condition cleared satisfactorily. Radiogram of chest showed no lung abscess.

CASE 3.—Girl of 16. Staphylococcal empyema probably complicating influenzal pneumonia. Admitted Jan. 28, 1941, on 6th day of illness, very ill, pale and toxic with palpable spleen. Signs of right basal pneumonia with pleural effusion. From 6th to 12th day sulphapyridine, 36 g., given by mouth. Further rise in temperature. On 8th day aspiration of sterile serous effusion from right pleural cavity. No tubercle bacilli in sputum. X rays showed opacity right base with doubtful evidence of lung abscess and loculated pleural fluid. On 13th day more turbid fluid aspirated; this grew *Staph. aureus*. From 16th to 20th day sulphathiazole, 36 g., given by mouth; no improvement. Pyrexia continued and was unaffected by further aspirations of the empyema, in which *Staph. aureus* persisted. Sputum showed no staphylococci, but was not examined for these organisms until 18th day. On 21st day rib-resection was done and drainage instituted. Biopsy of pleura showed no evidence of tuberculosis. Gradual improvement followed, patient becoming apyrexial and sinus healing.

CASE 4.—Man of 18. Boil on chin with sterile empyema. Admitted Feb. 7, 1941. Boil for 6 days and left pleuritic pain for 3 days. On admission febrile and toxic. Large furuncle on chin and left pleural effusion, which on aspiration was found to be purulent but sterile on culture. Blood-culture sterile. X rays showed opacity at base of left lung. From 6th to 12th day sulphathiazole, 40 g., given intravenously plus 48 g. by mouth. Further aspirations of pleural fluid on 7th and 8th days showed effusion to be less purulent and still sterile. Sulphathiazole content of pleural fluid 8·9 mg. per 100 c.cm. Drug rash appeared on 12th day. Patient became permanently apyrexial on 13th day, by which time furuncle and lung condition had almost cleared up. *Staph. aureus* cultured from furuncle.

SUMMARY

A group of 4 patients (2 male and 2 female) with staphylococcal pulmonary infections were treated with sulphathiazole; 3 of them had failed to respond to sulphapyridine. All recovered, though 2 required drainage of empyemas.

I wish to thank Dr. W. Allen Daley, medical officer of health to the London County Council, for permission to treat these cases. The sulphathiazole used in the clinical trials was supplied by Messrs. May and Baker Ltd.

REFERENCES

Blake, F. G. and Haviland, J. W. (1939) *Int. Clin.* **4**, 1.
Chickering, H. T. and Park, J. H. (1919) *J. Amer. med. Ass.* **72**, 617.
Everley Jones, H. W. (1938) *Lancet*, **2**, 1292.
Kammerer, W. H. et al. (1941) *Arch. intern. Med.* **67**, 855.
Kanof, A., Kramer, B. and Carnes, M. (1939) *J. Pediat.* **14**, 712.
Macgregor, A. R. (1936) *Arch. Dis. Childh.* **64**, 195.
Maxwell, J. (1938) *Lancet*, **2**, 1233.
Melton, G. (1941) *Ibid*, **1**, 274.
Reimann, H. A. (1933) *J. Amer. med. Ass.* **101**, 514.
Weisman, D. and Russell, H. (1940) *J. Pediat.* **17**, 31.

ACUTE LARYNGITIS COMPLICATED BY RECURRENS PARALYSIS

A. J. MOFFETT, M.B. BIRM., F.R.C.S.
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THE two cases here recorded, both in soldiers, were seen within a few days of each other during a period when acute upper respiratory infections were fairly common.

CASE 1.—Age 19. Ten weeks before examination had a severe sore throat, followed in a few days by gradual loss of voice. When seen could speak only in a whisper but could make a loud harsh noise when coughing. Throat, nose and pharynx mildly congested. Both antra dim on transillumination, but right antrum washout showed no macroscopic pus. Subacute inflammation of larynx with little muco-pus on right vocal cord. Trachea shared in general inflammation. Right vocal cord showed complete recurrent paralysis, cord being in cadaveric position. Right arytenoid could be moved with a probe.

X-ray appearances of chest normal. No glands palpable in neck. Postnasal swab gave Freidlander's bacillus and pneumococcus on culture; no diphtheria bacilli.

Three days later voice returned gradually, but it had peculiar cracked sound which patient stated was not there prior to illness. Two weeks later voice and appearance of vocal cords, except for gradual subsidence of inflammation, were unchanged.

CASE 2.—Age 38. Twelve days before examination was walking to duty on a bright but cold frosty morning. Had gone only short distance when became aware of slight tickling in throat. This got steadily worse from day to day, until two nights before examination was awakened from sleep by violent fit of coughing. Had several severe paroxysms ending in alarming inspiratory stridor which made him hold on to the bed to get his breath. Paroxysms recurred nightly, most severe being on night before examination. No loss of voice. Looked ill. T. 99° F., P. 100 per min. Nose and pharynx acutely inflamed; pharynx studded with œdematous lymphoid follicles and very sensitive. Small tender gland on left side of neck at level of hyoid bone. Larynx acutely inflamed; vocal cords and mucous membrane bright red. Trachea also inflamed. Left vocal cord showed paralysis in which some adductor movement was still present. Arytenoid mobile. That night had another slight paroxysm of coughing, but improved rapidly with expectorants, inhalations and rest in bed. X-ray appearances of chest normal. Postnasal swab gave few *Staphylococcus aureus*.

Ten days later condition had improved considerably. Paralysis of left cord now complete but laryngitis less inflamed. Voice tired easily and had not improved after a further ten days sick leave. Ten weeks after onset laryngitis had disappeared and paralysed cord had regained considerable range of movement.

The distressing inspiratory stridor experienced was probably due to an abductor paralysis in the early stages.

IN "The Battle of Britain" (Puffin Picture Book, 6*d*.) David Garnett has retold the story of August–October 1940 and James Gardner has illustrated it in colour. The Air Ministry account, on which this is based, must have thrilled every grown person in the country; this will bring in the under-sixteens.

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Reviews of Books

Diseases of the Heart

Diagnosis and Treatment. HENRY A. CHRISTIAN, M.D., F.A.C.P., Emeritus Hersey professor of the theory and practice of physic, Harvard University. London: Humphrey Milford, Oxford University Press. Pp. 599. 35*s*.

THE name of H. A. Christian on the title-page of a medical book is sufficient guarantee of its clinical soundness, and this reprint from the "Oxford Monographs on Diagnosis and Treatment" is no exception. Based largely on Dr. Christian's personal experience at the Peter Bent Brigham Hospital and in consulting practice, it presents an able and coherent picture of clinical cardiology. True to his title, he emphasises diagnosis and treatment rather than ætiology, but enough is said to ensure that the reader has some idea of current views on causation. The common conditions met with in practice receive most attention, but rarer conditions are not overlooked and there is a succinct chapter on glycogen disease, amyloidosis of the heart, and other such unusual findings. The references are confined to American literature, and it is good to know that despite the international situation we are still able to receive exports such as this from our American colleagues.

Diabetic Manual

(7th ed.) ELLIOTT P. JOSLIN, M.D. London: Henry Kimpton. Pp. 229. 10*s*. 6*d*.

THE appearance of the seventh edition of this book is a good indication of its popularity on both sides of the Atlantic. In the simplest of language a remarkably complete picture of diabetes mellitus is given to the reader; by the use of homely examples the details of treatment are made clear and the possibilities of misunderstanding are reduced by a series of questions and answers which show real comprehension of the patient's difficulties. But perhaps the greatest virtue of the book lies not in the competence which it displays in setting forth technical knowledge but in its attitude to diabetes as a personal problem. Its whole tone is one of hope; and it would appear impossible for a patient to study this manual without realising that, far from being at the mercy of a mysterious illness, he is in fact master of his own fate.

War-time Health and Democracy

HUGH CLEGG, M.B. Camb., M.R.C.P. London: J. M. Dent and Sons. Pp. 64. 1*s*.

A CHANGE has taken place in the professional attitude to subjects which a few years ago were dismissed almost without discussion. Proposals for state and socialised medicine are receiving a more sympathetic hearing. The war is naturally the precipitating factor in this changed attitude, but wider economic forces have created the possibility of change. That the situation does not affect only a minority is shown by the B.M.A. Planning Commission, which by its very existence has put it on record that somebody should do something. Dr. Clegg sets out to describe how the medical profession met the problems created by September, 1939, how the war affected the national health, and how the health problems which arose have been tackled. He gives a broad survey, well spiced with facts and figures. The title arose out of Lord Hewart's definition of democracy as a system of Government which allows "within agreed limits . . . freedom to criticise"; and the author holds that any system of state medical organisation which shackled this freedom would harm medicine and the people it serves. He points out that after this war the individual doctor will have to work in closer coöperation with his fellow doctors: rapid extension of medical knowledge and techniques compel this. Medical care will have to be administered to the patient by larger medical units, and in these the doctor will have to surrender some of his present freedom of action. "So long as initiative and imaginative thinking are not put into halters by a system that plays for administrative safety, the medical man will gain more than he will lose."

Although the book is written for the general public, it is of considerable interest to the medical reader, who may be slightly startled to see in cold print "No medical service can be other than a repair shop for damaged human machines so long as the people of democratic England live in a state of economic insecurity, are inadequately fed, and are badly housed." Yet Dr. Clegg believes that "the doctor, in relation to his professional work, should steer clear of politics. If after careful investigation he concludes that poverty is the root cause of certain diseases and ill-health, his job is to point this out, in season and out. The cause of poverty is a matter for political thinkers and economists." This seems a somewhat introverted view of the doctor as a democrat. If we have built a state in which poverty breeds ill health we have all had a hand in doing it, doctors and laymen alike; and the duty of undoing it must also be shared. It is not pleasant to picture the medical profession as a sort of encapsulated tumour—benign, no doubt, but cut off from a responsible part in the activities of the body politic.

Periodicity and Cause of Cancer

J. H. DOUGLAS WEBSTER, M.D. Edin., F.R.C.P.E., F.F.R., honorary director, Meyerstein Institute of Radiotherapy, Middlesex Hospital, London. London: Baillière, Tindall and Cox. Pp. 178. 12*s*. 6*d*.

IN following up the experimental observation that periodicity or rhythm in the rate of growth of transplanted tumours is sometimes conspicuous, Dr. Webster has endeavoured to show that similar fluctuation occurs in human cancer. He claims that regular and predictable fluctuations in growth-rate, time of recurrence and metastasis are characteristic of many carcinomas and sarcomas, and also of leukæmias and Hodgkin's disease. The evidence for this claim is set forth in a large number of case-histories, but it is nowhere very clearly stated exactly how the onset of increase or decrease in growth rate is determined nor the date of appearance of a recurrence or metastasis. Dr. Webster appears to depend upon the observations and complaints of the patients; but he claims to find an almost mathematically exact periodicity even with such an erratic source of information, and to have been able to predict the date of onset of a change in growth-rate, a recurrence, or the appearance of metastases in a number of patients. In those cases where predictions were made the patients were told to present themselves for examination at the time the change was due and the author believes the predictions were correct to within a week in 60 cases.

Venereal Diseases

E. T. BURKE, M.B. Glasg., director of L.C.C. Whitechapel clinic. London: H. K. Lewis and Co. Pp. 549. 30*s*.

THIS book is well prepared, well written and well illustrated; it is uncommon to find a textbook on any subject so readable from beginning to end. Much of the teaching is orthodox, but Colonel Burke held some interesting unorthodox views; it is perhaps unfortunate that he used this medium for stating them so strongly. He maintained, for example, that the gonococcus in urethral pus, far from being the intracellular victim of phagocytosis, is attached to the outer wall of the leucocyte and achieves its greatest virulence and most rapid growth in this situation; and he suggested that the gonococcus may be a harmless symbiote, perhaps a normal inhabitant of the genital tract, which becomes pathogenic only on occasions. These are no more than theories; certainly no strong evidence is here produced to support them and they cannot be said to explain the facts even as well as the accepted views.

In the treatment of syphilis he strongly advocated the alternating continuous use of arsenicals and bismuth rather than the concurrent intermittent method which has found greater support in this country. He recommended abnormally heavy doses of arsenicals, given over longer periods than are customary; but the total duration of the treatment advised for early syphilis is shorter than is generally held to be safe. His schemes of treatment have the disadvantage that the patient is required to attend three times a week for most of the period of treatment, and that no bismuth is given for the first three months, during which default is most common. For each preparation of arsenic and bismuth a figure of relative value is worked out, based on the "chemotherapeutic index" or the relationship of the minimum single curative dose to the maximum single tolerated dose. The effectiveness of treatment is

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estimated from an equation in which the total "therapeutic units" multiplied by 100 are divided by the number of weeks of treatment, the answer being the so-called "efficiency index." Given that treatment is administered for the number of weeks recommended for the stage of the disease, and an efficiency index of 60 or more, the patient is regarded as having had sufficient treatment. The average clinician may feel rather sceptical of this attempt to estimate the patient's reaction to treatment in terms of a mathematical formula, but the procedure has stood the test of Colonel Burke's experience and so commands respect. It may be questioned whether his classification of the stages of syphilis has much advantage over the Ricordian classification on which fundamentally it is based. Despite these criticisms the book is able and stimulating. It is to be hoped that it will not be allowed to pass into oblivion as a result of the author's untimely death.

Medical Societies

NUTRITION SOCIETY

THE first scientific meeting of the society was held in the Physiological Laboratory, Cambridge, on Oct. 18. Sir CHARLES MARTIN, F.R.S., took the chair at the morning session and Sir JOSEPH BARCROFT, F.R.S., at the afternoon session. In an introductory address, Sir GOWLAND HOPKINS, F.R.S., pointed out that the need for a nutrition society had long been felt. The subject was becoming so large and its implication so wide that it was no longer practicable to consider it as a subsidiary branch of biochemistry or physiology. More important perhaps was the need for closer collaboration between the laboratory worker and the clinician, between the public-health worker and the dietitian, between those concerned with human nutrition and those concerned with animal nutrition. Such coöperation was possible and a society such as this could bring it about. The secretary, Mr. Leslie J. Harris, D.Sc., read messages of goodwill from American nutritional workers and many English societies. The meeting took the form of a symposium on the evaluation of nutritional status. This was discussed under three heads: the assessment of the level of nutrition in man; the clinical signs of dietary deficiency; and the nutrition of farm animals.

ASSESSMENT OF LEVEL OF NUTRITION IN MAN

Dr. HARRIS reviewed the laboratory methods which have recently been evolved for the study of nutritional status in man. There were many reasons, he said, why such tests were of use—they could detect signs of deficiency earlier than was possible by clinical examination; even if no deficiency existed it was often useful to determine whether the reserves of a nutritional factor were high or low; the final symptoms of deficiency (for example, avitaminoses C or K) often occurred so suddenly that it was of considerable advantage to detect the possibility of their approach; lastly, the existence of partial deficiency in itself, while not necessarily causing obvious signs or symptoms, must result in some degree of ill health. Dr. Harris brought forward evidence for the reality of "partial deficiencies." The fact that frank beriberi or scurvy were rare in this country, or even that cursory examination revealed no sign of malnutrition, was not sufficient to prove that partial deficiency did not exist. The standards used in assessing malnutrition were often either inadequate and variable—such as the method of classification of nutritional status in school-children—or were too low, as for example were the past weight and height averages for children. The administration of iron to "normal" babies or of extra milk to "normal" school-children has resulted in considerable improvement in health and physique. He then described the methods which were available for the detection of partial deficiencies of different dietary essentials and gave examples of their use. By the urinary excretion method (the so-called "saturation" test) of measuring vitamin-C reserves it was shown that school-children in a poor district in Cambridge were lower in respect of vitamin-C nutrition than those from a well-run home for waifs and strays where the diet was adequate. The reserves of the vitamin were also found to be higher at the end of the summer than in the early spring. Large groups of children given various graded supplements of vitamin-C showed corresponding graded levels in their "reserves" as measured by this method. Low levels of vitamin C were found in patients with acute infectious diseases, in those on "gastric diets," and in lower economic classes. Tests such as these were being developed also for vitamin B_1 and nicotinic acid, and they offered a reliable method of obtaining exact information about the level of nutrition of individuals or groups of individuals in the community in respect of specific nutrients.

Dr. H. M. SINCLAIR spoke of the necessity for caution in interpreting the results of saturation tests. Alterations in renal threshold, rate of storage or rate of metabolism might conceivably affect the quantity of vitamin excreted in the urine, apart from the degree of saturation of the tissues. The postabsorptive level of a given vitamin in the blood was probably of greatest physiological significance since this determined the amount available to the cell. In attempting to assess accurately the nutritional status of individuals or groups, an exhaustive investigation was essential—clinical, clinico-laboratory and special tests in blood and urine. He gave examples of the methods by which nutrition surveys of this sort were being conducted in America.

Dr. JOHN YUDKIN gave an account of some recent surveys of the incidence of dark adaptation which he had been carrying out in collaboration with Mr. G. W. ROBERTSON, B.Sc. Poor dark adaptation in single individuals may be proved to be due to deficiency in vitamin A by the improvement which occurs when the vitamin is given. In comparing large groups of people, however, a comparison of the proportion in each group whose dark adaptation is good, bad or indifferent is sufficient to show the relative status of these groups as regards vitamin-A intake. Thus, in a study carried out in children from three Cambridgeshire schools, 60% of the children from two of the schools, and only 35% from the third school, were classed as having good dark adaptation. In adults, it is necessary to compare groups of similar age since there is a deterioration of dark adaptation with age. In three groups of young people below the age of 22, two of them—nurses and medical students—showed 80–90% who had good dark adaptation, while the third—workers in a Midland factory—contained only 55% in this grade. The factory workers were also examined as to their hæmoglobin levels. Nearly 800 subjects were investigated; more than 30% of the women and some 6% of the men had definite nutritional anæmia.

CLINICAL SIGNS OF DIETARY DEFICIENCY

Dr. B. S. PLATT stressed the point that the nutritional level at which clinical symptoms appeared was definitely lower than that at which optimal health is maintained. The detection of deficiency diseases rested not only on accurate examination but also on the response to specific therapy or on the improvement following a generally increased standard of nutrition. Illustrating his remarks with photographs, Dr. Platt pointed out some of the features of deficiency diseases as seen by him in China and Africa. In some instances the introduction of some simple dietary measure produced impressive results. The change, for example, to unwashed from washed rice in certain factories in Shanghai led to a considerable fall in the number of employees who had to give up their work. Dr. Platt emphasised the association between deficiency and infection. He referred also to the high incidence of infestation with the bed-bug found in people suffering from cheilosis. Finally, a great deal might be learned from the study of the general behaviour of subjects: the apathy and listlessness found in malnourished children contrasted greatly with the exuberance and high spirits of their better nourished neighbours.

Dr. R. H. DOBBS dealt with the assessment of the nutritional status of children. Adequate assessment must be made on the basis of physical examination, general behaviour (particularly as described by the mother and teacher) and the existence of special evidence of malnutrition. Of particular value in the physical examination was the condition of the skin, the musculature (including stance and posture) and the teeth. Apathetic behaviour, poor appetite and undue fatigu-

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ability would affect school progress and afforded a guide to general ill-feeding. Malnutrition might also be suspected from "external evidence" such as the family income or a history of artificial feeding without due care to supplement the diet with, for example, iron in one or other form. Conditions of stress were important in accentuating the effects of defective nutrition. Growth in childhood provided such stress and infection increased it, making it all the more important to assure the adequate nutrition of the child.

The question of physiological stress was underlined by Dr. W. C. W. NIXON. The increased demands of the body during pregnancy might well be sufficient to reveal a border-line state of deficiency. In Hong-Kong, beriberi frequently made its appearance during the latter half of pregnancy. Vomiting in the early stages might increase the deficiency of vitamin B_1. Such mild and often neglected complications of pregnancy as œdema and pins-and-needles might well be due to mild deficiency of this vitamin. Many women dying of beriberi during pregnancy had had œdema for a month or two before the diagnosis was obvious. Recalling the incidence during pregnancy of dental caries, anæmias, cramps, œdema, fatigue and pins-and-needles, Dr. Nixon asked whether, in the light of newer nutritional knowledge, it was not more likely that they were all signs of inadequate nutrition rather than necessary physiological concomitants of the pregnancy state.

NUTRITION OF FARM ANIMALS

Mr. C. CROWTHER, Ph.D., began by comparing the problems of animal nutrition with those of humans. The nutrition of farm animals was concerned chiefly with attaining as economically as possible a specific product. This did not necessarily involve the optimal nutrition of the animal and indeed might intentionally produce a pathological state. The worker in animal nutrition had many advantages over his colleagues studying human nutrition. His subjects offered a much greater freedom in experimentation, were more passive and hence less likely to interfere in the experiments, and lastly were much more uniform as regards genetic constitution. On the other hand, in determining the adequacy of an animal diet it was difficult to assess the quantity of available carbohydrate since cellulose was in part assimilable. The problem of the protein, too, was complicated in ruminants by the bacterial synthesis of non-protein nitrogen into amino-acids. The calculation of the energy value of the diet was also more involved than with human diets. The problem of supplying specific sources of vitamins did not often arise in the nutrition of the farm animal, especially when grazing. In considering the effects of such supplements, it was necessary to bear in mind the other constituents of the diet, since their effects were often more than simply additive.

Mr. H. H. GREEN, D.Sc., reviewed some of the commoner deficiency diseases of animals. Vitamin deficiencies were not common except in animals intensively reared in stables, batteries or styes. In such conditions, deficiency of vitamin D might occur in poultry and of nicotinic acid in pigs. Mineral deficiencies, on the other hand, were not uncommon. Aphosphorosis, for example, was well known in South Africa. Deficiency of the trace elements—copper, cobalt and possibly manganese—also occurred. Swayback disease amongst lambs appeared to be due to deficiency of copper, and possibly also of cobalt.

Mr. JOHN HAMMOND, D.Sc., F.R.S., discussed the question of the total energy and protein of the diet. Animals kept on a low plane of nutrition for a short while after birth are not only smaller than normal at the end of this period but go on being small into adult life. The weight of animals fed for long periods on a low plane of nutrition may be less than half that of litter mates receiving a larger amount of food. Not only the size of the body but also the relative proportions of the different parts are greatly affected by controlling the food intake at different levels. These effects, too, produced in young animals, may persist to adult life even if the diet has subsequently been increased.

DISCUSSION

Prof. J. L. MAXWELL, M.D., stressed the importance of detecting early signs of deficiency. He suggested that pain in the back and legs, and instability in walking often occurring in pregnancy were possibly early signs of vitamin-D deficiency. It was necessary also to bear in mind that deficiencies were likely to be multiple rather than single.

Prof. E.-J. BIGWOOD said night-blindness in Austria in 1918 appeared first in pregnant women, another example of the effect of pregnancy revealing a latent deficiency. In a prisoners' camp in Germany the Russians developed scurvy and the Rumanians developed pellagra although all were given the same deficient diet. With regard to the question of saturation with a factor such as vitamin C, it had often been asked whether this was necessarily identical with the optimal intake. If guineapigs, one of the few species of animals which can develop scurvy, are allowed a free choice of diet they become saturated with vitamin C. Moreover, the amount of the vitamin in the blood reaches the same level as that of other species of animals in whom scurvy cannot be produced but for whom nature synthesises the requisite vitamin C.

Dr. DAGMAR WILSON appealed for the standardisation of the signs of early deficiency so that workers could be trained, as in India, to recognise them easily. She had been able to recognise several cases of angular stomatitis in Oxfordshire school-children.

Mr. GEOFFREY BOURNE, D.Sc., pointed out that among the early signs of vitamin-B_1 deficiency were increased irritability, lassitude and a general deterioration in mental alertness. In the detection of early deficiency he had found the Göthlin test for capillary fragility of use in showing a lowered intake of vitamin C in patients with peptic ulcer.

Mr. S. K. KON, D.Sc., suggested that a further test for malnutrition was the estimation of vitamins in the milk of nursing mothers. Tests already begun showed that there was a considerable drain on the vitamin-A reserves of the mother and that the amount of vitamin C is now considerably lower than that found in 1934 by Dr. Harris.

Prof. H. D. KAY, D.Sc., said that although, as Dr. Crowther had pointed out, the provision of extra supplies of vitamins was not perhaps essential for all classes of farm animals, it would considerably affect the nutritive value of the animal product as far as their use in human nutrition was concerned. Thus, the amount of vitamin A in milk was dependent to a very large extent on the amount ingested by the cow.

Prof. OTTO KESTNER recalled some of his work on protein deficiency in Germany in the last war. He also pointed out that while vegetable proteins might singly be of low biological value, together they might act complementarily so that defects in one might be made good by another.

Dr. S. W. SWINDELLS hoped that one of the objects of the new society would be to disseminate accurate knowledge of nutrition.

Dr. E. H. WILKINS looked forward to the adoption of simple tests for malnutrition and mild deficiencies which would be easily applicable by medical officers of health. He instanced the importance of a study of posture in children as a guide to nutritional status.

Dr. ROBERT SUTHERLAND wished to see emphasised aspects of nutrition which would lead to the adoption of generally satisfactory diets, rather than those which led to the development of studies of deficiency diseases, their assessment and their specific cure.

Sir JOSEPH BARCROFT, referring to the present status of laboratory methods in the diagnosis of deficiency disease, recalled the similar position which arose after the introduction of such diagnostic aids as the electrocardiogram by Mackenzie and Lewis. Clinicians were at first sceptical as to their usefulness, but this was mainly because the apparatus was costly and the technique specialised. He felt that laboratory methods in the study of malnutrition would soon reach a state of recognition and applicability comparable to that enjoyed today by the technical methods used in cardiology. As far as the question of the separate study of the various nutritive factors was concerned, he felt no apprehension that this would detract from a proper study of malnutrition as a whole. He looked forward to the time when we knew enough about nutrition to construct a completely synthetic diet.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 1, 1941

NATIONAL WAR FORMULARY

THERE was a time when a doctor could achieve a fair reputation as a prescriber by the liberal use of pharmaceutical cocktails such as the compound tincture of cardamon, and by avoiding the more spectacular catastrophes of incompatibility represented by explosive mixtures. The advent of national health insurance, by curbing extravagant prescribing, showed many practitioners the error of their ways, and not a few physicians were content to hang the blunderbuss in the hall and practise polypharmacy no more. Modern war, which is fought as savagely in the realm of economics as on the battlefield, has now forced all doctors to exercise more discrimination when prescribing. The therapeutic requirements committee of the Medical Research Council stated the position succinctly in their memorandum [1]: "Economy in the use of a drug may be necessary in war-time because the drug is imported or because its manufacture at home diverts materials and skill from other essential services." The committee classified drugs into those which we can or must use freely (A), those with which we must be careful (B), and those which we must give up altogether (C). Based mainly on this classification a National War Formulary [2] will shortly be issued by the Ministry of Health, and its importance can hardly be overstated. The general practitioner is specially concerned, for the N.W.F. will replace the National Formulary for N.H.I. purposes on Dec. 1, before which date all insurance practitioners and pharmacists will receive a copy. But the new formulary is not intended exclusively for N.H.I. patients, as its children's section bears witness; it is hoped that all practitioners will familiarise themselves with the N.W.F. and use it when prescribing for their private and hospital patients as well.

Comparatively few doctors are sufficiently well informed on the dry bones of materia medica to appreciate the more subtle reasons for avoiding this or that drug as a contribution to the war effort. They will therefore be glad to have the guidance of the section on war-time prescribing. The reasons for some of the "Don'ts" are at once apparent, particularly those referring to confections, glycerin and alcohol. On the other hand, it will come as a surprise to many that they must go carefully with such commonplace substances as linseed, starch and soap liniment (high alcohol content). We referred last week (p. 489) to the urgent need for economy in aspirin, and this is mentioned in the formulary, though it includes mixtures and tablets containing aspirin. If the results of recent research [3] are accepted, it follows that five grains of aspirin have as powerful an analgesic action as ten. There seems therefore to be no pharmacological justification for the practice (as common among doctors as laymen) of taking "a couple of aspirins"; the essential thing is that the dose should be absorbed, by grinding it up, chewing it or taking it in suspension. There are some helpful remarks on proprietary preparations, the abuse of which has become the blight of modern therapy. To quote the formulary: "Before prescribing any proprietary preparation the medical practitioner should consider carefully whether the needs of the patient would not adequately be met by the use of a drug or preparation which is identical or of reputed analogous therapeutic effect. Particularly should he refrain from prescribing proprietary preparations of foreign origin." Because of skilful publicity and their convenience these preparations tend to accumulate in the doctor's therapeutic armamentarium, and the prescriber is likely to continue to use the original trade-name long after the identical substance has become official—usually under a name which has some bearing on its composition but not necessarily easier to remember on that account. There can now be no excuse for such extravagance.

In this country we are well supplied with works of reference on materia medica, but our B.P., our B.P.C. and our Martindale tell us little about the relative effectiveness, availability and cost of the preparations they describe. Sweet indeed are the uses of adversity which has compelled a committee of distinguished medical men and pharmacists to come to grips with these aspects of prescribing. The advice which the N.W.F. offers has been made necessary by the difficulties of supply, but there has clearly been a careful search among pharmacological title-deeds in deciding the claims of each drug. Exception can be taken to few of the successful candidates, though it is difficult to justify the inclusion of opium in a lotion; the addition of sodium bromide to the sleeping draught containing chloral hydrate merely spoils the end-point of the latter drug; and mist. brom. et arsen. is based on the long-exploded belief that a small dose of Fowler's solution prevents bromism. There is a welcome departure from the so-called classical prescription, with its tiresome insistence on basis, adjuvant, corrective and vehicle; and there is evidence of a determined effort to eliminate superfluities and go straight to the point. A diagnosis having been made and drug treatment decided on, this booklet shows how simple it is to prescribe for the patient. The legacy of elaborate polypharmacy bequeathed to us has here been decisively repudiated; let us hope that this wholesome decision, forced on us by the war, will remain ours by choice with the return of peace.

1. Economy in the Use of Drugs in War-time. M.R.C. War Memorandum No. 3, 1941, p. 3.
2. H.M. Stationery Office. Pp. 70. 6*d*.
3. See *Lancet*, 1941, 1, 483.

INSUFFLATION OF THE FALLOPIAN TUBES

SINCE the procedure was first described by RUBIN in 1920 insufflation of the fallopian tubes has been largely practised by gynæcologists in this country, and various modifications of RUBIN'S original apparatus have been made, notably those of BONNEY and PROVIS. This minor operation, however, largely because of its simplicity, is sometimes misapplied. KING,[1] who surveys his results in 635 insufflations, sets up six indications for insufflation—as part of a routine investigation in cases of primary and secondary sterility; as a help in the differential diagnosis in obscure pelvic conditions; to determine the state of the residual tube after salpingectomy for any reason;

1. King, G. *Caduceus*, 1930, 19, 161.

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to confirm the success of a sterilising operation; as a routine after salpingostomy or uterotubal implantation; and as a therapeutic measure in maintaining or improving tubal patency. His four contra-indications should be noted. First and foremost is menstruation or any other type of uterine bleeding. The only proper time to perform insufflation is in the week succeeding menstruation; if this rule is broken safety is sacrificed and the test is vitiated. Yet how many hospital insufflations are done haphazard at any time in the intermenstrual phase? Secondly, any acute or subacute pelvic inflammation, notably cervicitis, for here the danger of retrograde infection is very real. The third and fourth—pregnancy and severe constitutional disease—are self-evident.

KING'S technique differs from the accepted practice in several important points, the most striking being that he eschews special preparation and anæsthesia and performs his insufflation in the outpatient clinic. This alone saves patient, surgeon and institution much time and money and his results and those of American gynæcologists conclusively prove the safety and efficacy of the proceeding. A careful bimanual examination is made to rule out any pelvic contra-indication. The patient is then placed in the lithotomy position, suitably draped, and the vagina, cervix and cervical canal are carefully cleansed with an antiseptic such as 5% mercurochrome or Dettol. A uterine sound is passed after gently grasping the cervix with a fine volsellum, and this gives minimal discomfort to all but the most nervous patients. A special uterine cannula with a gas-tight joint at the cervix is inserted and an assistant turns on the gas. KING uses carbon dioxide and limits himself to a flow of 30–60 c.cm. per minute, and this in normal cases should be all that is necessary to demonstrate patency; he never exceeds a pressure of 200 mm. of mercury. The apparatus is so connected that the behaviour of the tubes is recorded permanently on a kymograph. While the investigation is proceeding the assistant auscultates both iliac regions for the intra-abdominal passage of gas, while the operator sees that no leakage takes place at the cervix, watches the recording needle and keeps an eye on the patient. The resultant graph will divide patients into four main types: normal patency, tubal spasm, tubal stenosis and complete tubal obstruction. In cases of normal patency, and these comprised 50% of KING'S series, gas passed at a pressure of under 100 mm. and well-marked oscillations at the rate of 3–5 per minute were recorded on the kymograph, due to normal tubal peristalsis. The presence of these waves, which increase in frequency and vigour as the time of ovulation approaches, establishes normal behaviour of the tubal musculature beyond doubt. The graph obtained with one patent tube is no different from that with both patent; hence the importance of auscultation on each side of the abdomen. KING only encountered tubal spasm in 3·5% of his series, and this figure agrees closely with that of RUBIN. Here the gas does not pass until a high pressure is reached, sometimes approaching 200 mm. of mercury. Thereafter it passes readily and the graph then obtained differs in no way from that of a tube of normal patency. It is doubtful whether any clinical importance is to be attached to tubal spasm, and to overcome this some workers give a routine dose of atropine before examination.

In cases of tubal stenosis, where inflammation has thickened and fibrosed the tubal wall with formation of strictures or kinks, with or without peritubal adhesions, the kymograph will show absence or great impairment of peristaltic activity. This occurred in 12·5% of KING'S series, and he rightly points out that in this class of case Lipiodol injection will give a normal picture, yet this is the very tube that is most likely to be associated with sterility, since though patent it is largely functionless or subfunctional. Insufflation in these cases is often painful, probably from the stretching of adhesions, whereas in normal patency it is as a rule painless. Tubal obstruction was encountered in 34% of KING'S cases, a figure which again agrees with that of RUBIN. Such an obstruction may occur at the cornu, in the tube, or at the abdominal ostium. If at the cornu no gas passes, of course, and the patient experiences a midline pain of uterine distension. If the obstruction is at the abdominal ostium the pain may be referred to one or other iliac fossa. The graph obtained in tubal obstruction is characteristic, with a flat plateau at or near 200 mm. Hg, which is sustained until the gas pressure is released. Certain symptoms may be experienced by the patient during the test. There may be slight pain as the uterus and tubes are distended with gas, passing off as the gas enters the peritoneum; more severe central lower abdominal pain or iliac-fossa pain usually indicates a blockage at the cornu or the abdominal ostium respectively. Any severe pain is a signal to stop the examination. Shoulder pain is diagnostic of pneumoperitoneum and thus of tubal patency. It was noticed by KING in 157 patients, especially when they assumed the standing position at the conclusion of the examination; it was invariably slight and transitory, and often not remarked on unless a special question was put. In all cases of patency an X-ray or screen examination will reveal gas under the diaphragm.

Certain dangerous sequelæ occurred in 17 of KING'S cases. Many of them were mild, such as nausea in 5 cases, vertigo in 3, fainting in 1 and a hysterical attack in 1. In 5 cases there was severe pain, probably due to the presence of hydrosalpinx, which is naturally a contra-indication to insufflation. There were 2 cases of suspected gas embolism, a danger which has been used as an argument against insufflation. Both of these patients quickly recovered. In the first a pressure of 200 mm. Hg was used and on rising she complained of malaise and precordial pain and started to cough violently, producing a moderate amount of blood-stained frothy sputum. She had a rapid pulse and was cyanosed. After 20 minutes these symptoms passed and after resting another 20 minutes she was allowed up and felt well. A tentative diagnosis of gas embolism of the utero-ovarian veins was made. The second case was similar except that the patient had a slow pulse of 40; she recovered in 4 hours. Both these patients had blocked tubes and both were insufflated rather late in the cycle, on the 11th and 16th day. The lessons to be learned from them are that in tubal stenosis prolonged insufflation is dangerous and the amount of gas used should not exceed 50–75 c.cm. If any unusual symptoms arise during the test it should be stopped at once. If the operator is alive to the dangers and contra-indications there is no reason why these unpleasant reactions should deter him from its performance. The dangers

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of gas embolism are much less in the conscious than the anæsthetised patient, for the diagnosis is immediate in the one and masked in the other. On the therapeutic value of insufflation KING is wisely guarded. RUBIN claimed that 17·5% of his sterility cases became pregnant after the operation, and nearly half of these in under two months, an observation confirmed by many subsequent writers. Such a result is more empirical than scientific yet the figures are impressive. The conclusion must be that insufflation is a useful procedure, that it should be carried out as an outpatient rather than an inpatient operation, that a kymographic apparatus gives the best and only certain evidence of the functional behaviour of the tubes, and that if due regard is paid to the indications and the danger signals it is safe.

THE MENTAL HOSPITAL PICTURE

IT is not perhaps generally realised how great a contribution the mental hospitals of the country have made to the Emergency Medical Service. Large numbers of beds had to be found at the outbreak of war, and a considerable proportion of them were provided by the mental hospitals, some of which were emptied for the purpose, while others renounced treasured new blocks or sizeable annexes. Most of the big mental hospitals have given up a quarter of their beds. This meant that patients had sometimes to be overcrowded. Moreover, shortage of nursing and medical staff, darkening of wards by protective blast walls and blackout curtains, and other unavoidable war restrictions have impaired standards in treatment and living conditions. At one large hospital, for example, a modern block for newly admitted cases and a newly opened villa for convalescent patients were vacated and handed over to the E.M.S., to provide 250 casualty beds and a nurses' hostel. Thereafter treatment of early mental cases had to be carried on in the wards of the old hospital, where grading and segregation were difficult. In this hospital, as elsewhere in the country, the number of voluntary patients admitted has fallen, but the reduction does not indicate that facilities for the treatment of such patients have been seriously limited; certainly in the London area not a single application for voluntary treatment has been refused through lack of accommodation. Taking the country as a whole, 100 admissions are made up of 40–60 certified, 10–12 temporary and 30–40 voluntary patients. The falling off in total admissions that has been reported reflects the common experience that war does not increase the incidence of psychosis and neurosis. In London the drop in new admissions has been far greater than it was in the last war, probably owing to evacuation. Nevertheless, in some areas, patients who for social reasons ought to be in a mental hospital are not being accepted, or are being discharged, because medical superintendents say quite fairly that they must keep their accommodation for the acuter cases. These less acute patients may be found causing mild difficulty in their homes or in reception areas by behaviour which would not be tolerated in peace-time. On the other hand, many patients of both sexes with relatively mild mental and emotional disorders are being absorbed into regular employment, and are finding occupational therapy in jobs for which in peace-time they would never be taken on; and perhaps in time to come we shall have to plan the rehabilitation of psychopathic people on the lines thus artificially produced by war. It is possible, of course, that more patients who would normally seek treatment as voluntary cases in hospital are being seen and treated at outpatient clinics, of which there are 203 distributed over the United Kingdom and Northern Ireland; but no such increase has been reported. Indeed, in many of the clinics situated in large cities there has been a decided falling off in attendances as a result of evacuation. In general the position is that the mental hospitals, though hampered by the sacrifice of accommodation which has been made to the E.M.S., by shortage of doctors, and even more serious shortage of nurses are standing up bravely to their job, and deserve much credit for maintaining a vital social service approximating to peace-time standards under heavy difficulties.

SCHOOL MEALS

OF the five million children in our elementary and secondary schools only 300,000 are now getting a meal at school; and, while in some areas school meals are provided for a third of the children, in others there is no provision at all. In the reception areas children often have to travel several miles to school with no chance of returning to their temporary homes for a midday meal; if there is no meal at school they have to subsist on frugal packet lunches put up by harassed foster parents. These nosebags were inadequate in peace-time and must be more so now when cheese and meat are scarce, foreign fruit has disappeared and home-grown substitutes are expensive. Moreover, with the vastly increased employment of women in munitions there is often no-one to prepare meals at home and supervise their consumption. As speakers in the Women's Parliament pointed out in their session reported on another page, universal school meals would not only be a great step towards ensuring adequate nutrition of our children, but would also release more women for industry than any other measure. In the House of Lords on Oct. 21 Lord WOOLTON foreshadowed a rapid expansion in school-meal organisation. The Exchequer is greasing the ways with an additional grant of 10% towards their cost, making the average rate of grant 80%, and school canteens are to receive priority supplies of food. The cooking depots which local authorities have been holding in readiness for feeding the community if communications or normal domestic arrangements were put out of action are to be adapted for the children, and the British Restaurants are also to help with cooking school meals. Where new kitchens must be started local authorities will be able to draw on the Ministry of Food's central pool for their equipment.

These steps are encouraging, but as the *Times* pointed out in a leading article on the morning of Lord WOOLTON'S announcement it will hardly be possible to provide a midday meal for all school-children in war-time unless some English variant of the Oslo meal is adopted. This has already been attempted successfully in the East End of London, in Glossop and elsewhere. The theoretical principle behind the Oslo meal is that if at one meal in the day highly protective foods, chosen from dairy foods, greengroceries, the oily fish and whole cereals, are given it will not matter much what foods are chosen by the child's parents for the rest of the day. The

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Norwegian public-health services, on the advice of Prof. CARL SCHIÖTZ, chose milk (about ⅔ pint), half an orange, hard rye bread with butter and cheese, wholemeal bread and butter, and a whey cheese or cod-liver paste. The meal was finished off with half an apple or a raw carrot. This meal is highly protective, giving satisfactory amounts of calcium and iron and vitamins A, B, C and D. It is easy to prepare and demands no cooking, so that kitchens and dining-hall can be largely dispensed with.

If the authorities could be induced to envisage anything but the hot cooked meal as essential in feeding the young we should have gone a long way towards solving the problem of safeguarding the health of the school-child, for this Oslo meal is a better safeguard than the ordinary hot meal. There would remain the resistance of school-teachers and parents, for the children, conservative as they often are as regards the contents of cooked meals, usually take to an Oslo meal. The staff have "never heard of such a meal" and the parents are apt to feel that their children are being defrauded by being given cold uncooked foods. That this kind of meal solves the problem of inadequate equipment is clear from the experience of domestic-science teachers who have been allowed to introduce a meal of the Oslo type because the demand for school meals had outrun the school equipment. In one such school the Oslo meal largely invaded the province of the cooked meal. English variants are not hard to devise. The milk should be the same in each meal, though there is no objection to giving it hot or flavoured with cocoa or coffee if it is thought essential that some hot food should be served. Wholemeal bread could take the place of the *Knackebrod*, and vitaminised margarine the place of butter. Apples and raw carrots are still available. The main problem lies in supplying what the half orange, the cheese, and the cod-liver paste supply. If oranges are unobtainable, watercress, mustard and cress, and raw turnip or swede will take their place, or sandwiches with fillings of chopped raw cabbage and parsley may be used. The cheese and cod-liver paste supply calcium and vitamin D, but these could as well be obtained from fresh herrings and sprats, or more simply from tinned herrings and salmon, and there should be no difficulty with the simplest of appliances in converting them into a paste to spread on bread. If we wish to imitate the Norwegians in giving a teaspoonful of cod-liver oil daily throughout the winter this can be incorporated in the fish paste. In the *Times* of Oct. 11 the director-general of Norwegian health services says that the significance of a hot meal has been overestimated, and it seems that all the benefits of hot food, with some others, can be obtained from a cold meal with a hot drink. This looks like being the way in which school meals for all can be achieved. All that is now required is imagination and the dropping of our British resistance to the unusual in catering.

Annotations

BLACKWATER FEVER

THE cause of the paroxysmal hæmoglobinuria which gives blackwater fever its name has long been disputed. It is known to be associated with malaria, although parasites may not be found in the patient's blood. Is there a specific strain of parasites which is specially liable to cause hæmolysis of red blood-cells in excessively large quantities? Do patients have hæmoglobinuria because their red cells, possibly from long exposure to malarial attacks, are exceptionally liable to hæmolysis? Is there a hæmolysin in the patient's blood responsible for the destruction of the red cells? Foy and his co-workers[1] have tried to answer these questions by studying the results of injecting blood from blackwater-fever patients into unaffected people, and conversely by transfusing normal blood into blackwater-fever patients. The results in one woman are presented in detail. This was a typical case with black, acid urine containing oxyhæmoglobin and methæmoglobin, and with methæmalbumin in the blood-plasma; no malarial parasites were found in her blood. Twenty-five c.cm. of this patient's blood was injected intravenously into a normal healthy man. Eleven days later, although he had been kept strictly away from possible outside infection, the man developed a typical malarial attack and *Plasmodium falciparum* rings were found in thick films of his blood, but he did not develop hæmoglobinuria. This confirmed Foy's previous experience with a series of 106 lunatics who were given intramuscular injections of blood from blackwater-fever patients; several of the recipients developed malaria, but none showed hæmoglobinuria. From these results he concluded that there is no specific hæmolysing strain of malarial parasites. The patient herself was given three blood-transfusions from three different normal donors, and although these raised the red-cell count at first it was soon reduced to its former level, the hæmolysis continuing unabated. From this it is concluded that normal cells are just as liable to hæmolysis in a blackwater-fever patient's blood-stream as are the patient's own cells. At the time of the transfusions the patient's reticulocyte count was low and the rise and fall of the red-cell count seemed definitely related to the effect of the transfusions and subsequent hæmolysis; later, when the reticulocytes rose, recovery set in. Foy therefore infers that a circulating hæmolysin is the active factor that produces the intense hæmolysis of blackwater fever. The fact that no recipient of blackwater-fever blood developed hæmoglobinuria he attributes to insufficient dosage or immediate neutralisation of the hæmolysin. This research has certainly cleared the ground and it is interesting that, like other workers on paroxysmal hæmoglobinurias,[2] his final conclusion points to a hæmolysin. So far, however, the hæmolysin remains theoretical—its presence has yet to be firmly demonstrated. Fairley, also working on this point, thinks that it is an intracellular lysin and cannot be detected by ordinary means. Whatever the final answer, it is clear that the information obtainable from studies of blackwater fever can usefully be applied to hæmolytic disease in general.

1. Foy, H., Kondi, A. and Moumjidis, A. *Trans. R. Soc. trop. Med. Hyg.* 1941, **35**, 119.

SULPHONAMIDES AND TISSUE-DAMAGE

REPORTS from various sources have so far indicated that the local use of sulphonamides in the treatment of wounds has little or no damaging effect upon the tissues. The brain tolerates powdered sulphanilamide and sulphapyridine surprisingly well, as Russell and Falconer[3] demonstrated, and this might be regarded as a fairly severe test. On the other hand Bricker and Graham[4] have found that the oral administration of sulphanilamide to dogs with experimental wounds seems seriously to inhibit the fibroblastic response. On the strength of this Glynn[5] has investigated in rabbits the local effects of sulphanilamide, sulphathiazole and sulphapyridine on the development of granulation tissue

2. *Lancet*, May 24, 1941, p. 667.
3. Russell, D. S. and Falconer, M. A. *Lancet*, 1940, **2**, 100.
4. Bricker, E. M. and Graham, E. A. *J. Amer. med. Ass.* 1939, **112**, 2593.
5. Glynn, L. E. *J. Path. Bact.* 1941, **53**, 183.

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in experimental wounds. A disc of rabbit blood-clot was introduced into a pocket made between the dense fibrous layer deep to the platysma and a similar sheet covering the deep musculature of the haunch on either side. On one side 0·25 g. of the drug was also inserted. Sections of the wounds were examined at various stages of healing up to 2 weeks. Glynn found no histological evidence that any of the three sulphonamides inhibited the formation of collagen or pre-collagen fibres, or the development of new blood-vessels. The macrophage response likewise did not seem to be impaired, though there was evidence of diminished phagocytosis in the treated wounds. Sulphathiazole and sulphapyridine persisted in crystalline form up to 5 and 7 days respectively but the sulphanilamide was completely dissolved within 24 hours. An attempt was also made to estimate the quantitative effects of these sulphonamides by fibroblast counts at 5, 7 and 14 days. With sulphanilamide no significant difference was found on comparing the treated wounds with their controls; a very slight inhibition of fibroblast proliferation could be attributed to sulphapyridine and sulphathiazole. On the other hand, sulphanilamide was found to have a slight but definite toxic action on striped muscle. Sulphapyridine had a still slighter action while sulphathiazole had none. It may thus be concluded that, while it is safe to use all three drugs in the local treatment of wounds, it would be preferable to use sulphathiazole for wounds of the face, hands and forearms where the minimum of scarring is desirable.

MUSCLE ATROPHY

THE reaction of a muscle to the severance of its nerve is as a rule divided into three phases. In the first period, lasting about a week, there are few changes in the muscle, morphologically or chemically. But the emergence of slow contraction and rising chronaxie at the end of the first week indicate that important changes are then taking place. The beginning of the second phase is characterised by the onset of spontaneous rhythmical contractions—fibrillation—which can be seen in the exposed muscle or where the cover is thin—e.g., in the tongue by the reflected light. A more delicate method for detecting, and for recording, fibrillation is the electromyogram, as Denny-Brown and Pennybacker[1] have shown. At the same time as the fibrillation starts, there begins a rapid progressive atrophy of the muscle, demonstrable in the reduction of its volume and weight. The transition to the third phase is gradual; when the cross-striped substance disappears and the interstitial fibrous tissue proliferates the fibrillation ceases, and the muscle is gradually converted into a non-excitable and non-contractile tissue, histologically something intermediate between scar tissue and tendon.

How does the fibrillation originate, and what has it to do with the atrophy? The first question is not definitely solved yet. But it is known that the onset of fibrillation coincides with an increase of the susceptibility of the muscle to acetylcholine, and therefore Denny-Brown and Pennybacker assumed that the fibrillation of the muscle undergoing atrophy after denervation is due to excitation of each muscle-fibre by the small amount of acetylcholine circulating in the blood. This has been questioned by Eccles,[2] who found that curare depresses the sensitivity of the denervated muscle to acetylcholine without affecting the fibrillation. J. N. Langley was inclined to believe that the fibrillation took precedence over the atrophy, in other words that the atrophy was not one of disuse but one of fatigue or exhaustion; "the muscle inadequately protected by its refractory period, driven even to the utilisation of its own material," as Tower[3] puts it. The evidence for this assumption being far from satisfactory, Solandt and Magladery[4] studied the subject experimentally. They established the weight-loss curve of rat muscles after denervation, and demonstrated the presence of fibrillation by recorded action potentials. They then prevented fibrillation in some of their muscle preparations by giving various drugs, of which quinine and quinidine were the most effective. Atrophy still developed in all these preparations, though they had never exhibited fibrillation as detected by the electrical method; hence it was concluded that the atrophy of denervation is not due to the fibrillary activity. However, the weight loss in the animals given quinidine was not quite as great as in the controls. This is attributed to the fact that the quinidine induced a lethargic condition which rested the denervated muscle or protected it from mechanical injury, and this view was supported by the observation that hypnotics, while not affecting fibrillation, decreased the atrophy to an extent comparable to that brought about by quinidine. The results are in keeping with the clinical experience that prevention of mechanical injury—stretching seems to be the most deleterious—may keep the muscular atrophy within limits; more important still, these experimental findings should remove the prejudice against electrical treatment of the denervated muscle which was based on Langley's theory. As long as there was reason to believe that muscular atrophy was due to exhaustion by over-activity, some reserve in applying more stimulation seemed advisable. This theoretical difficulty is now removed. Moreover, the beneficial effect of electrotherapy no longer lacks experimental foundation. Fisher,[5] in experiments on rats, found that the electrically stimulated muscle, treatment being applied for 10–20 minutes a day—showed a striking increase of weight compared with the resting denervated muscle of the opposite side.

STITCH

THE cause of stitch has been much debated, and the decline of interest lately does not imply that it has been satisfactorily explained. The theories put forward—contraction of the spleen, distension of the spleen, pull on visceral suspensory ligaments, faulty vasomotor regulation with distension of the liver and spleen in "constitutionally inferior" subjects—were seldom formulated on first-hand information; and none of them explains every variety of stitch. Capps[6] has reported the results of a study, lasting several years, of 114 attacks of stitch which he observed personally in 55 people. He found them by watching the track team of Chicago University High School; men out of training at an impromptu track meeting at Northwestern University; students engaged in wrestling and basketball; and a few of his friends. He also listened to what the professional coaches had to tell him. Of his subjects, 44 were men and 11 women, and ages ranged from 15 to 65, but only 3 were over 35. He found that the right or left upper quadrant of the abdomen was the usual site of stitch, but it might occur anywhere in the abdomen, at the costal margin, at the nipple, in the precordium or—in one case—in the second left interspace. The position varied in different people, and often in the same person on different occasions. Some described the pain as sharp, some as dull, some as constricting, as a pressure, a cramp or a gnawing. It usually passed off quickly, but might last ten or twenty minutes. It was invariably brought on by physical exertion, ranging from walking to strenuous running, riding, swimming, boxing, wrestling, ski-ing, squash, or basketball. Walking was only a cause just after a heavy meal. Training had a variable effect; in 2 subjects attacks of stitch disappeared as training proceeded, in 3 others they persisted. This

1. Denny-Brown, D. and Pennybacker, J. B. *Brain*, 1938, **61**, 311.
2. Eccles, J. C. *Med. J. Aust.* 1941, **1**, 573.
3. Tower, S. S. *Physiol. Rev.* 1939, **19**, 1.
4. Solandt, D. Y. and Magladery, J. W. *Brain*, 1940, **63**, 255.
5. Fisher, E. *Amer. J. Physiol.* 1939, **127**, 605.
6. Capps, R. B. *Arch. intern. Med.* July, 1941, p. 94.

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variation is well recognised by coaches. An attack rarely disappears if the exertion is continued, so that it has no relationship to second wind. Cold weather seems to be a factor. In a cross-country race run in a temperature of 15° F. 40 out of 60 competitors had to give up because of stitch. On another occasion one team "warmed up" outside in the severe cold and were able to finish the race, whereas their opponents warmed up indoors and all except one developed stitch. Deep breathing usually increased the pain; bending over towards the side of the stitch, or pressure over the site, usually relieved it. Capps suggests that the symptoms and the variability of the pain can be explained as being due to ischæmia of the diaphragm. The relation of the pain to exertion, the compulsion to stop exertion, the relief on resting, and the precipitating effects of a full stomach and of cold resemble findings in angina pectoris and intermittent claudication, and give grounds for considering the ætiology of stitch alongside that of these proved ischæmic conditions. That the pain is one-sided can be explained by supposing that one side is affected first; thanks to the interruption of exercise the other side escapes. The relief of the symptom by pressure over the painful spot or by bending towards the affected side could be explained by the consequent limitation of diaphragmatic movement. Capps mentions the agonising stitch-like pain of uncontrollable laughter; laughter is associated with a series of rapid contractions of the diaphragm, and "laughter, holding both its sides" is certainly commoner after a large meal. The theory that stitch is a referred pain from angina of the diaphragm to the intercostal nerves is a fascinating one, but the mechanism is as yet not definitely established. Stitch in the shoulder might be expected on this hypothesis, but this was not observed though sought for. Further evidence could be obtained by blocking the intercostal nerves involved in the supposed reflex, and possibly by observation of the diaphragm with X rays. The theory must also be weighed in the balance of clinical observation.

INTRASTERNAL TRANSFUSION

ANYONE with much experience of blood-transfusion must have been baffled by patients with non-existent veins, with veins which persist in becoming blocked (particularly where long and slow transfusions are required), with veins so collapsed or contracted in shock that they will not allow the transfusion fluid to pass, and by those cases in which every vein has already been used up. This problem seems to have been solved by Tocantins and O'Neill,[1] whose preliminary tests have been most successful. They found that saline solutions were absorbed rapidly from rabbits' bone-marrow and they adapted this finding to blood-transfusion in man. In adults the sternum is used, preferably the manubrium or midway between the angle and the xiphoid process. In children under three years the upper end of the tibia or the lower end of the femur is preferred. The technique is not difficult and can easily be mastered on the cadaver. Tocantins and O'Neill use an instrument consisting of a gauge-15 needle housing an inner gauge-18 needle which in turn contains a stylet. Three lengths are desirable—2, 3·5 and 5 cm.—and once inserted the needle is prevented from penetrating more deeply by a collar held by a set-screw. The site chosen is first anæsthetised down to the periosteum with procaine, and the double needle is then pushed and twisted down to the periosteum at right angles to the skin. Next the needle is tilted to about 30° with the skin and the anterior plate of the bone is perforated. This is recognised by a lessened resistance. The collar is then adjusted and the stylet removed. A syringe containing about 1 c.cm. of saline is attached to the inner needle and gentle suction should bring some marrow into the syringe. Not more than 0·5 c.cm. of marrow is aspirated and the inner needle is removed and flushed out with the saline and reinserted. Saline is alternately injected and aspirated through it to displace air from the outer needle. Finally 1–2 c.cm. of saline is injected into the marrow, the inner needle removed and rubber tubing filled with saline leading from the reservoir is attached to the outer needle. Speed is essential because marrow clots easily. At first the flow is only about 2–4 c.cm. per minute but it quickens in about a quarter of an hour. With a head of pressure of about 100 cm. the rate of flow in adults has been up to 25 c.cm. per minute and in the tibia or femur in children up to 4·2 c.cm. per minute. A successful infusion can only be given into a vascular bone-marrow and this will contain very little fat, so that the danger of fat embolism is said to be non-existent. Tocantins and O'Neill had no untoward reactions with 52 infusions in 33 adults and 7 infants.

1. Tocantins, L. M. and O'Neill, J. F. *Surg. Gynec. Obstet.* 1941, 73, 281.

EVERYBODY'S BUSINESS

IN the United States health education has long been valued as a tool by public health workers. They recognise, as a recent report[1] from the American Public Health Association shows, that even with adequate sanitation, immunisation and enforcement of laws, no community can achieve its highest possible standard of health unless it has been educated to the job. To be wholly effective any programme would have to be universal, reaching every section of the public and taking into account both local and general public health requirements. No such universal plan is yet available, but individual ventures are afoot in many states, and a committee was set up by the association to study some of these; this report gives arresting accounts of them. Local programmes may have the drawbacks of parochialism, but they also have its advantages; for, as the report says, "it is a sound, democratic, self-reliant procedure for a group of people, with the help of specially qualified leaders, to find their own health problems and to seek the needed information through which they can solve these problems." The committee studied the health programmes in action in 26 communities in 12 states. Many of these communities had made great use of the schools in their plan, judging that the child's influence on the parent was likely to be considerable; advertisers indeed have long guessed as much and often plan campaigns which reach the parent through the child. Moreover, as the committee point out, the school is the only social agency employing trained educators in the ratio of one to every forty people. The usual approach was to get the children first to observe and make lists of the health needs of their community, then to analyse these in the classroom and study how such problems are being met elsewhere, and finally to plan a solution of their local problems which would be within the means of the community.

A campaign against hookworm in Bulloch County, Georgia, is a good example of the method. The zone committees of the schools learned through the state health department that 60% of the school-children were infested with hookworm, in one school the figure being as high as 83% and in another as low as 43%. Here was a communal as well as a personal problem. First the school teachers had to be taught about hookworm and to take a test set by the health department, which also supplied literature and films for the teachers to use later in the classrooms. Then the pupils studied the hookworm, its life-history, the way it spreads, and how those infested can be treated. They went home and told their parents about it, no doubt graphically. Plans were then laid for treating infested children and adults, and for preventing further soil pollution. The schools, the health department, the doctors, the parents of the children and the

1. Community Organisation for Health Education. A report of a committee of the Public Health Education Section and the Health Officers Section of the American Public Health Association, 1941.

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rest of the grown citizens were all persuaded to take part in the campaign. By the spring of 1940 the incidence of hookworm in the schools had been reduced to 28%. Meanwhile pupils and teachers had been studying soil pollution and had come to the conclusion that it could best be prevented, in their county, by building sanitary pit privies. Each child then made a report on the presence or absence of such a facility at his home; where a pit privy existed he reported on its site and condition, and in this way a map of sanitary conditions in the county was compiled. The schools then sponsored a project for the construction of privies. Members of the Parent-Teacher Association gave the lumber, the health department provided the plans and chose the site, and other bodies were responsible for labour and transport of workers. Between the autumn of 1936 and the spring of 1940 approximately 3500 privies were built.

Other studies undertaken in the schools covered immunisation against smallpox, typhoid and diphtheria, provision of school meals, a campaign for better home gardens and home canning; all resulted in a substantial advance in standards, the full effects of which on health will be apparent in a few years time.

A similar story is told of Appomattox, Virginia, where the school-children and their mothers joined in making a survey of the drainage and water-supply of every farm-house. The value of safe water and possible sources of contamination were studied in school, and then the children set about planning improvements in their home water-supplies. Finally committees of pupils visited various farms and tried "to sell the idea of a better water-supply." As a result, springs were fenced to keep cattle out, curb and housing were provided for an open well, springs were cleaned, water was piped for stock, and other practical advances were made. One boy paid four persuasive visits to a family in whose unprotected water-supply mosquitoes were breeding; he failed to convince them that something ought to be done about it, but he learned a lot about the difficulties of achieving and maintaining a high or uniform standard in public health.

The report is full of stories of such victories and defeats and it is significant that the victories greatly predominate. To the English reader the striking thing is the plastic and friendly relationship which seems to exist between official bodies and the public. Might not our own well-fenced bureaucracies look askance at a public health plan in which school-children were expected to play a crucial and responsible part, or at a map of sanitary facilities which depended on the direct observation and report of the people using them?

GERMAN VIEWS ON BLOOD-TRANSFUSION

IN war-time as in the good old days of peace it is worth while to find out what the other fellow is thinking or doing, but this becomes increasingly difficult as foreign journals get scarcer. E. Schulz, in a review of German blood-transfusion methods (*Dtsch. med. Wschr.* July 18, p. 779), says that the direct arm-to-arm technique is the best, though the fatality with this method is still 0·5%. Using anticoagulants, citrate gave rise to rigors but heparin did not. Clotting was also retarded by storing blood in containers with paraffin-lined walls. But the standard way of storing blood in Germany seems to be to mix it with an equal volume of doubly distilled water containing 0·5% sodium citrate and 4% glucose. Of blood substitutes, physiological saline and a crystalloid solution named "tutofusin" are stated to remain in the circulation for only 1–2 hours, but serum (fresh, stored or dried) and a colloid called "periston" which is said to have no pharmacological properties remain in the circulation for 12 hours. No hint of the composition of tutofusin or periston is given. Emphasis is laid on the value of blood-transfusion for conditions other than anæmia or hæmorrhage. For example, numerous small transfusions of stored blood are recommended in gas gangrene. Immuno-transfusion is used for sepsis, typhoid, diphtheria, influenza, erysipelas and typhus, and replacement transfusion—combined bleeding and transfusion—is recommended for acute toxæmia. Schulz is dogmatic about the quantities to be used; more than 400–600 c.cm. should, he says, never be given at one time owing to the possibility of heart damage, which is more likely to occur if blood substitutes are used. But for the hæmoconcentration of burns a blood substitute such as 30% glucose solution, periston or serum is preferred. In the treatment of shock only 200–250 c.cm. of blood or substitute should be given, but for fluid replacement 400–600 c.cm. is allowed. Such rigid standards, although they may serve to prevent over treatment by enthusiastic novices, cannot be in the interest of the patient. It must surely be better to treat the patient according to the deficiency from which he is suffering, and the limits Schulz sets will then often be exceeded.

CHILD ENDOWMENT

BY an act which came into force early this year a federal system of child endowment has been introduced in Australia. From July 1 a payment of 5*s*. per week will be made for each child under 16 years of age in families containing more than one child, and a similar allowance will be made to children in approved charitable institutions. Normally the endowment will be paid to the mother and must be used for the child's "maintenance, training and advancement." It is estimated that about a million of the 1,830,000 children in Australia under the age of 16 belong to families with more than one dependent child so that the annual cost of the scheme is some £13,000,000. Two millions of this will be gained by abolishing income-tax abatements for each child after the first (so that the 5*s*. will not in some cases be a clear gain), two millions from general revenue, and nine millions from the proceeds of a new pay-roll tax. From the short account of this important legislation given in the *Ministry of Labour Gazette* for September, 1941, it appears that this tax is payable by all employers with a pay-roll of over £20 a week and is at the rate of 2½% on all wages, salaries, commissions, bonuses or allowances paid in money or kind. The working of this scheme will be watched with interest in this country. Meanwhile a similar but localised movement to ease the position of families with young children is reported from Birmingham. Acting on the advice of its salaries, wages and labour committee the city council has decided to give married employees 2*s*. 6*d*. a week for every child of school age, an innovation held to be more appropriate to war-time conditions, and fairer, than a general advance in wages for married and unmarried alike. The alternative method now to be widely extended is to provide a good midday meal for all school-children. This has the special advantage that it reaches not only necessitous children but also those whose mothers find it difficult, with or without endowment, to combine work of national importance in factories or elsewhere with the task of running a household. Appliances, staff and suitable premises may be hard to come by, but such difficulties are not to stand in the way; one way or the other we shall bridge the slough of despond through which too many families with young children have had in the past to journey.

AT the Royal College of Surgeons of England on Tuesday, Nov. 4, at 2.30 P.M., Mr. L. R. Braithwaite will deliver a Moynihan lecture on the ileo-gastric syndrome. Two Imperial Cancer Research Fund lectures will be given by Dr. W. E. Gye, F.R.S., director of the fund. On Nov. 6, at 3.30 P.M., he will speak on cancer of the breast, and on Nov. 13, at 3.30 P.M., on filtrable tumours. Dr. A. P. Cawadias will deliver the Thomas Vicary lecture on Nov. 26, at 2.30 P.M. His subject will be hermaphroditism. All these lectures will be held at 1, Wimpole Street, W.1, and doctors and students are invited to attend.

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Special Articles

SOLUSEPTASINE SPRAYING IN THE PROPHYLAXIS AND TREATMENT OF COLDS*

W. R. THROWER, M.D. LOND., M.R.C.P.

THE application of various sprays and other solutions to the upper respiratory passages enjoys general popularity for its supposed effects on acute catarrhs, but no scientific evidence has ever been advanced which would justify the widespread adoption of any particular prophylactic or therapeutic measure of this kind. Properly controlled research on "colds" is difficult to carry out on the scale necessary to produce results likely to bear statistical analysis. Several large experiments have been conducted in the past to evaluate some of the more promising agents for controlling colds, such as vaccines, vitamins and ultraviolet light (Bashford 1938, Sherman 1938, Diehl et al. 1938, Read 1939). The results, however, were disappointing.

Among matters affecting health in crowded air-raid shelters the question of what to do about colds featured largely but no existing method of prophylaxis or treatment seemed sufficiently established for immediate application; yet something had to be done and done quickly. Having in mind the usefulness of sulphonamides in controlling the secondary invaders of the common cold (Yates 1939, Elyan 1938, 1939), the feasibility of using these compounds was reviewed by the Horder Committee, for if even the unpleasant sequelæ of colds could be reduced it would be a distinct therapeutic advance. The prophylactic use of sulphonamides by mouth is open to serious limitations under the best conditions, and their widespread use among shelterers would be hazardous. There was some evidence that the course of common colds might be influenced by the application through an atomiser of a solution of disodium-*p*-(γ-phenyl-propyl-amino)benzenesulphonamide-α-γ-disulphonate, commonly called Soluseptasine, though a solution of this sulphanilamide derivative similar in all respects to that used for the present investigation in the form of nasal drops did not produce very striking results in a small-scale experiment (Dudley Hart 1941).

To apply a soluble sulphonamide in solution to an epithelium possessing the particular characteristics of that in the nose is a very different matter from placing sparingly soluble compounds into purulent wounds, concerning which opinion has been expressed elsewhere (Thrower 1940), or into carefully investigated wounds of the type described by Colebrook (1941).

Certain limitations are imposed by any field trial, and such weaknesses as may exist in the scheme finally adopted for shelters derive from the necessity of making the trial simple and capable of speedy completion. Such simplification was more than justified in the light of experience gained by working and living among shelterers, and the practical limitations of similar surroundings on any such future trial should be remembered. Unqualified census figures from individual shelters are misleading for various reasons. The floating population of all shelters is high, owing to social visits and similar causes. This irregularity can be lessened by the ticket system of entry. Quiet nights are immediately reflected in poor attendances, and with an early "all clear" many naturally return home. Arrival and departure times are variable, depending on such diverse factors as the closing times of public-houses and families waiting for treatment "until Dad comes from work." The mass exodus in the morning raises its own problems. Ailments totally unconnected with the one being investigated are suggested as being due to the test, and this leads to defection in the control as well as in the treated group. The idea that "they are doing something" about upper respiratory infections has considerable popular appeal, but the need for regularity, always important but doubly so in any trial, is unappreciated by the public at large. Persuasion is the only approach possible, since there is not even the discipline of a hospital outpatients or the health service of a large undertaking. Treatment at an entrance doorway is impracticable, and plans for each shelter must be devised on the spot. Mass treatment at medical aid-posts does not work.

As originally conceived, the trial was planned to determine whether the routine spraying of nostrils would have any effect on the incidence of colds, but separate records were made to determine whether treatment shortened the period of malaise and local discomfort. Solutions of various compounds in different strengths were tested privately on volunteers but all were abandoned for various reasons, with the exception of a 10% solution of soluseptasine in water containing 20% w/v glycerin to lower surface tension. For the control group the solution used was normal saline.

One basement-type shelter was selected for treated cases, and one in an adjacent London borough for control cases, no-one knowing the nature of the solutions used. The general conditions in these shelters were comparable in that they were in the basements of modern flats and housed people of similar social type. The average nightly population during November, 1940, was approximately 250 in each shelter, but the numbers declined with quieter nights, to rise again with more aerial activity, different people, however, often taking the place of the former occupants. The general decline in all shelter populations, apart from staffing difficulties, made the obtaining of reliable statistics in immediate further trials of this nature so unlikely, except under unmanageable conditions, that two tube stations were chosen for further trials, as probable sources of quick results. A tube station of simple design was selected, the up platform being used for treated cases and the down platform serving as control. The net numbers treated here again reflect the problem of the floating population and defections. As a control against the first station, another one was used, but the results proved worthless for statistical assay owing to sociological difficulties. The results obtained in basement shelters cannot be compared with those obtained from tube stations owing to the entirely different nature of the surroundings.

TECHNIQUE AND RESULTS

A mixed group of men, women and children were sprayed in each nostril with the appropriate solution night and morning with three puffs from an ordinary nasal atomiser, the total quantity used being kept as constant as possible at about 0·6 c.cm. (i.e. 60 mg. soluseptasine).

For the guidance of other workers a few practical points are worth recording. To those who are not laryngologists it is remarkable what a wide variation there is in the size, shape and direction of the nasal passages possessed by an unselected crowd of people. Some practice is needed with individual cases to be sure that the atomised solution comes into wide intimate contact with the nasal mucosa. In ordinary practice among patients who may have to treat themselves it may be important to ensure that this proper application is effected. Constant use of atomisers shows how frail and unreliable many of them are. Metal nozzles are essential so that quick sterilisation in a flame is possible when numbers of patients have to be treated. In any large-scale treatments constant supervision by a medical man is necessary in the early stages, not only to reassure the public but also to train nurses or other helpers in the requisite technique.

No epistaxis or signs of general toxicity occurred in either group. Subjects in both the treated and control groups, particularly the former, remarked that they tended to have wetter noses than normally, and maybe some pronounced cases of this wetness have been recorded as colds on single occasions when diagnosis by a qualified person was not possible; these doubtful cases have been excluded from both groups before the assessment of results. There were no complaints of nasal congestion or obstruction, while chance sampling with a nasal speculum revealed no abnormalities. Some subjects with colds in both groups claimed relief of symptoms immediately after the spraying.

A log was kept showing the occasions on which people were sprayed night and morning, and recording the onset

* Based on the report of an investigation carried out on behalf of the Horder Committee on Health Conditions in Air-raid Shelters (Ministry of Home Security and Ministry of Health).

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and duration of colds, including those already in existence when the trial commenced, the first 36 hours of these being excluded. People who said that they were suffering from a cold often claimed relief in 12 hours (when the next record was made), but these " colds," as mentioned above, have been excluded from the total figures. The low average period of observation despite the large numbers treated is due to the chronic absenteeism, while people who received less than seven days' treatment have been excluded.

Prophylaxis.—In the basement shelters 57 treated persons were observed for an average of 1·5 weeks, and 43 (75%) had colds. Of 70 controls observed for an average of 2 weeks, 39 (55%) had colds. In the tube stations 115 persons were observed for an average of 2·8 weeks, and 12 (10·4%) had colds. Of 90 controls observed for an average of 2·5 weeks, 18 (20%) had colds.

It will be seen that in the basements there were proportionately more colds in the treated than in the control subjects, whereas in the tubes the reverse applied. The variations in both cases were greater than could be explained by mere chance, but I cannot put forward any other explanation. Both basement shelters had epidemics of colds during the experiment.

Treatment.—In the basement shelters the average duration of colds has been roughly assessed from the protocols as 60 hours in the treated and 199 hours in the control group. In the tube stations the average duration was 28·9 hours in the treated and 49·8 hours in the controls.

The difference in duration of the colds in the two types of shelter may have been due to the better ventilation and greater space per person in the tubes, or it may, of course, have been due to greater virulence of the organism producing the epidemic colds in the basements. No clinical pathology was possible, so that the nature of the colds could not be determined.

CONCLUSIONS

In the small controlled experiment completed no case was made out either for or against the prophylactic spraying of nostrils with a solution of soluseptasine. The practical limitations to success in such a procedure suggest that no useful purpose would be served by continuing this in the shelters at present. The basis is admittedly small, but the figures do suggest a reduction in the average duration of colds in both the treated groups compared with the controls. This confirms the clinical impression concerning soluseptasine which justified the trial being carried out, and a repetition of the work is desirable on people living in closed communities suffering from colds, using the technique developed during the present investigation. Observations in connexion with general hygiene which must affect the incidence of upper respiratory catarrhs were outside the scope of the experiment.

Credit for the expedition of the trial is due to Dr. G. H. Oates and Dr. H. A. Bulman, medical officers of health, and my thanks are due to the scientific staff of Messrs. May and Baker Ltd. for technical assistance, and to Mr. Bradford Hill, D.Sc., for checking the results.

REFERENCES

Bashford, H. H. (1938) *Proc. R. Soc. Med.* **31**, 185.
Colebrook, L. (1941) *Ibid*, **34**, 337.
Diehl, H. S., Baker, A. B. and Cowan, D. W. (1938) *J. Amer. med. Ass.* **111**, 1168.
Dudley Hart, F. personal communication.
Elyan, M. (1938) *Brit. med. J.* **1**, 146.
— (1939) *Ibid*, **1**, 1215.
Read, W. W. (1939) *Canad. med. Ass. J.* **41**, 493.
Sherman, J. B. (1938) *Brit. med. J.* **2**, 903.
Thrower, W. R. (1940) Surgery of Modern Warfare, London, p. 102.
Yates, A. L. (1939) *Canad. med. Ass. J.* **41**, 275.

MEDICINE AND THE LAW

Damages against Chiropodist

IN Colston *v.* Frape, a recent case at the Barnstaple county court, a woman recovered £62 15*s.* damages with costs for injury to her foot. She had visited a chiropodist for treatment of her corns; he advised her that her toes required treatment. When she paid a second visit for this purpose he took hold of her foot with both hands and twisted and jerked it with some force. Such was her evidence, and she complained that, in consequence of the wrench, she suffered pain and could not now walk so well as formerly. The defendant, who described himself as a chiropodist and specialist in the fitting of shoes, said that he formed the opinion that the plaintiff was suffering from some form of pressure on the nerves; he denied wrenching her foot or inflicting worse pain than she was already experiencing. He had manipulated the foot in order to " free the nerves and strictures "; he admitted that this might have caused some local " stagnation " to flare up. The judge held that the chiropodist, though neither responsible for the original condition of the foot nor negligent or unskilful in his treatment, had been at fault in his diagnosis or advice. If he did not know what was wrong, he ought to have advised the plaintiff to see a doctor. The court awarded damages for the injury due to the wrong treatment being administered after the primary injury had occurred. The judge did not fail to point out that the plaintiff had voluntarily submitted to the treatment and knew quite well that the chiropodist was not a surgeon. We have noted in these columns other cases where a patient's faith in an unqualified practitioner has been inadequately rewarded. The Medical Act set up a Register because, as its preamble declares, it was " expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners." This is no advantage to patients who prefer to get their manipulative surgery from a chiropodist.

Professional Monopoly

In spite of such cases the uninstructed public will doubtless continue to speak as though registered practitioners possessed a monopoly of practice in surgery and medicine. If one wants to see a true professional monopoly at work, one should turn to the legal profession. Penalties await any unqualified person who dares to " act as a solicitor " or sue out any writ or process as such, or begin or defend any legal proceeding in the name of any other person, or who, " for or in expectation of any fee, gain or reward," draws or prepares a will or other legal document. The new Solicitors Bill, which has passed through Parliament with an ease the more surprising because its clauses have no intimate connexion with the national war effort, fortifies an already formidable organisation. An unauthorised person will have the onus of proving that he did not act for or in expectation of a fee. Every solicitor will have to join the Law Society, though this requirement will not operate until a poll of all practising solicitors has shown a two-thirds majority in its favour. Another interesting feature is the creation of a compensation fund to relieve the losses suffered by members of the public through acts of dishonesty or breaches of trust committed by solicitors or their clerks. To this fund every solicitor will have to make a fixed annual contribution not exceeding five pounds. Shall we yet see all registered medical practitioners compelled by law to contribute to a pool for guaranteeing patients against the consequences of professional negligence?

E.M.S. Surgeon's Libel Action

One of the surgeons appointed by the Ministry of Health to deal with war and air-raid casualties under the Emergency Medical Service had occasion recently to claim damages for defamatory statements suggesting that he had been inconsiderate, incompetent and negligent in the exercise of his professional duties. The plaintiff was Mr. G. H. Lawson Whale, F.R.C.S., who had been appointed to the Hampstead General Hospital. After an air-raid on Hampstead a year ago a mother and two daughters attended at the hospital. One of them was discharged at once; another had a hæmatoma near her mouth and the medical practitioner who attended to her asked Mr. Whale's opinion about tracheotomy. After making an examination Mr. Whale advised that the operation was unnecessary. Three weeks later Mr. Thomas Sargant, in whose house the three women lived, addressed to the secretary of the hospital a letter complaining that the surgeon who attended to them was " callous and brutal in his attitude to them "; he was " chiefly concerned to get them out of hospital as soon as possible "; he " succeeded in his harsh manner in reducing all the patients to tears." Later Mr. Sargant

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wrote that the surgeon in question was Mr. Lawson Whale. Mr. Whale naturally took action upon these damaging statements. As his counsel explained, he did not seek punitive damages but merely asked for a verdict which would discourage such allegations as Mr. Sargant made. The three women were not Mr. Whale's patients; it was no part of his duty to interfere in their treatment unless invited to do so. Mr. Sargant had been told that he was misinformed; he had, however, refused to accept the statement. Mr. Whale denied in the witness-box that the hospital was conducted in the spirit of getting rid of patients as quickly as possible. Mr. Justice Atkinson asked if the Ministry of Health had issued any instruction for turning patients out on a war-time rather than a peace-time standard. Mr. Whale replied that he had always found it easy to keep patients there as long as he would have done in normal times. The hospital staff had been warned to regard themselves as a casualty clearing station rather than as a base hospital; actually they had found it possible at all times to act as a base hospital. Mr. Arthur Gray, F.R.C.O.G., a colleague at the hospital, expressed the opinion that the three women were not in fact suffering from shock.

Mr. Sargant gave evidence on the second day of the hearing and explained his motives. His original letter had said that he made his protest as a ratepayer; in his written defence he had pleaded that the occasion was privileged inasmuch as he addressed the hospital as a citizen, taxpayer and ratepayer of Hampstead, in good faith and without malice, under a sense of duty to someone who had a corresponding duty in the matter and in the honest belief that the contents of his protest were true. If the occasion were privileged Mr. Whale would not succeed unless he could prove malice. Having heard Mr. Sargant's evidence, Mr. Whale felt satisfied that the defendant had acted in good faith. He himself had been concerned merely to protect his reputation against what seemed the malicious attack of a busybody. He was now prepared to withdraw the action and pay the defendant's costs; Mr. Sargant on his side acknowledged that his letter had been too strong and expressed his regrets. The judge approved the settlement. In his view the occasion of the letter was undoubtedly privileged. It was important, he observed, that it should be made clear that there had been no plea of justification; Mr. Whale's course of action implied no admission that complaint was well founded. So long as there was no reflection upon Mr. Whale, his lordship was satisfied with the result; he did not wish it to be thought that this termination of the case reflected upon the plaintiff in any way.

SCOTLAND

THE SCOTS HOSPITAL PROBLEM

ON Oct. 14 the Secretary of State for Scotland, replying in the House of Commons to a question on hospital policy, said that he was having consultations with the bodies concerned and could not at that stage add anything to the general statement made by the Minister of Health. The bodies concerned are presumably the voluntary hospitals, the local authorities and the Nuffield committee. The Minister of Health in his general statement foreshadowed some special measures applicable to Scotland in the formulation of hospital policy, and doubtless these special measures will be under discussion at the meeting to which Mr. Johnston referred. The difference between the hospital problem in Scotland and that in England is essentially one of degree. Scotland, as is well known and as was brought out in the report of the Committee on Scottish Health Services, is not nearly so well provided with hospital beds as is England. If, as Mr. Johnston said in opening the Ayrshire Central Hospital recently, it is the aim of the Government in their plans for the post-war hospital service to ensure that proper treatment is available to every person in need of it, the question of adequate provision in Scotland is one that is bound to be compelling. It is probably true, as the Secretary of State said at Ayr, that there are large numbers of people suffering unnecessary pain or discomfort, unable to pull their full weight, the condition of many of them deteriorating. He wants to remove that reproach to our hospital system, and he wants to develop the hospital service in the form of a kind of partnership amongst the various hospital authorities, and especially to see the greatest possible coöperation between voluntary hospitals and local authorities, so that every hospital may fill the roll best fitted to it in a coördinated scheme on a regional basis. The Secretary of State desires, by implication, to retain the voluntary hospitals, and doubtless he must be giving serious thought as to the best method of giving necessary state aid to them—whether through the agency of local authorities or not. He must be concerned, too, to know how best to utilise the ad-hoc hospitals erected under the auspices of his department and directly administered by it. These hospitals were primarily designed to fill gaps in the treatment of war casualties, but it would be preposterous to allow them to fall into disuse when the war is over, though there may be a strong Treasury urge in that direction. It seems probable that these hospitals will have to be retained as important entities in a coördinated service involving local authorities, voluntary hospitals and the Department of Health. Whether the last named will wish to continue to administer these hospitals directly is one of the intriguing but comparatively minor problems that beset the Secretary of State.

HEALTH OF EIRE

THE report of the department of local government and public health for the year ended March 31, 1940, records a decline in the incidence and mortality of the principal infectious diseases, in infant mortality and in maternal mortality. The number of notifications of infectious diseases—6146—was the lowest since 1930, and about 1900 fewer than in 1938. This reduction was mainly due to a fall in the incidence of scarlatina and of diphtheria, the latter probably due to the campaign of preventive immunisation carried out in recent years by the county medical officers of health. Yet there were still 2097 cases of diphtheria with 245 deaths and 2779 cases of scarlet fever with 43 deaths. Compared with the previous year, typhoid notifications had risen from 254 to 385 and the number of deaths from that disease from 46 to 56. Many of the cases were traced to carriers. In a local epidemic in co. Kerry, with 103 cases and 8 deaths, infection was spread by separated milk from a creamery. The milk was apparently infected by a case of typhoid in one of the farms supplying the milk. In the creamery the cream was pasteurised and converted into butter, but the separated milk was sold untreated. In most of the cases there was definite evidence that the separated milk had been consumed by the patient; no case was traced to the butter. There were only 5 cases of typhus, with 3 deaths, and this disease seems to be gradually disappearing. Only 76 cases of puerperal sepsis were notified, the smallest number for many years; the number of deaths from this cause was 38, the lowest on record.

The infant mortality-rate was 66 per 1000 births, which is lower than that for Northern Ireland (70) or Scotland (69), but higher than that for England and Wales (50). Congenital debility heads the list of the causes of infant mortality, premature birth comes second and diarrhœa and enteritis third. The infantile death-rate in urban areas was 83 per 1000 births—90 in Dublin—and the rate for rural areas was 55. Mortality from tuberculosis had increased—1·13 per 1000 of the population as against 1·09 in the previous year. But these are the two lowest figures ever recorded. There are no trustworthy statistics to show the incidence of the disease, as notification is only mandatory where the sputum or other infective discharge is liable to spread infection. This useless order dates back to 1919 and has always hampered the campaign against tuberculosis. Nevertheless, owing to the great effort which was made to assure notification and certification it is probable that the increase was not real. The medical officer of Cavan said: "The generation now growing up has little or no conception of the universal dread of this plague which prevailed when the campaign against tuberculosis was initiated thirty years ago." Most of the medical officers of Eire have worked hard to overcome this dread, which lived in Ireland long after it had died elsewhere, and because of their efforts and the growing enlightenment of the people concealment of tuberculosis is gradually passing, but it is still prevalent, especially in the west. In 1939 135,404 school-children were examined. Dental defects were observed in 46·6%,

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and disease of the tonsils or throat in 19·1%. Treatment of these conditions is provided free where necessary.

The administration of the Milk and Dairies Act by the local authorities has been on the whole satisfactory, and legal proceedings for non-compliance with statutory requirements have been successfully instituted, though the report adds that some local authorities were reluctant to take action on the recommendations of their medical and veterinary advisers. This seems to understate the case, for many local authorities fail to appreciate the importance of the act and are unwilling to prosecute negligent milk-producers, while the local justices fail to impose adequate penalties in the cases brought before them.

During the year 952,936 new cases were attended by the 646 dispensing medical officers. It seems, therefore, that about a quarter of the population of Eire received medical attendance under the Medical Charities Act. The income of the Hospitals Trust Fund for 1939 was over £1,202,600, and the expenditure £367,800. Grants of £270,384 were made to poor-law and county hospitals, and £209,822 to voluntary hospitals, of which £126,072 was to meet current expenses.

ARGENTINA

AVIATION

A SERVICE of air ambulances for both official and private use has been established under the control of the national department of health. When used for private patients the charge is 50 centavos a kilometre. Three machines are permanently attached to this service in the sparsely populated regions of the Chaco and the southern territories. Analysis of the effects of aviation on both healthy and sick people has led Prof. M. R. Castex and his colleagues to conclude that of the cardiac and circulatory disorders only cases of myocardial degeneration can safely be carried by air, and that patients with respiratory affections other than bronchitis or chronic pleural disorders of a non-exudative nature should also avoid flying.

It is planned to establish a division for the sanitary supervision of aircraft in the department of health, with a view to checking the spread of infection by aircraft arriving from infected regions. Aviation is on the increase in the Argentine. In 1938 there landed in Buenos Aires 770 aircraft carrying 7300 passengers, whereas in 1940 the figures were 1800 aircraft and 15,800 passengers. Aircraft may carry infected insects, but there is also the risk that passengers may still be in the incubation period of an infectious disease when they arrive and so will not appear ill.

BREAST-MILK CENTRE

The government has established a non-profit-making centre in Buenos Aires for extracting, preserving and distributing surplus breast milk. The old mothers'-milk stations were mainly based on the wet-nurse system, but this centre obtains its milk from normal mothers, and it is found possible to take 200–300 grammes from many mothers without depriving their own children. The donors' family histories are inquired into, and they undergo a periodic clinical, radiological and serological examination. During 1940 over 5000 litres of milk were supplied to 1200 babies from 350 donors. The price charged ranged from 7*s*. a litre down to nothing according to the means of the recipient; more than half of the milk was supplied gratuitously.

PSITTACOSIS

During the pandemic of 1929–30, which involved Buenos Aires and part of northern Argentina, about 200 cases of psittacosis were reported. Then in the next nine years there were only isolated cases, but in 1939 an outbreak in Buenos Aires produced 27 cases, of which 13 (48%) died. The disease mainly attacks adults of 45–55 and hardly ever children. Men and women are affected equally, and bird-dealers are, as might be supposed, the commonest sufferers. Cold weather seems to favour the propagation of the disease, and the incubation period is 7–14 days. During this last epidemic hæmorrhagic skin lesions have been observed. No treatment has been of any avail.

HEART DISEASE

Of 10,000 school-children examined in Buenos Aires 2·4% had organic heart disease, 2% being acquired and the remainder congenital. It is hoped that early recognition of cardiac lesions will improve the prognosis, for Prof. Rafael Bullrich estimates that the mortality from cardio-articular rheumatism is at present as high if not higher in the Argentine than in any other country, and a speaker in the Senate said that 2·4% of Argentine children under 14 die from the disease. According to Macera and Costa Bertani the fatality from acute rheumatism in children under 15 is 22% in Buenos Aires and 12·5% in Rosario.

Professor Bullrich has also made a clinical and statistical study of people over 60, and in the last ten years he finds that circulatory diseases accounted for 43% of the deaths between 60 and 80; if nephritis is included (and nearly all cases in this age-group are circulatory in origin) the figure rises to 47%. Since 540,000 of the 13½ million population of the Argentine are over 60 the social significance of these diseases is clear. The number of hospital beds for such cases is insufficient, but much may be hoped from the work of the Institution for Social Assistance to the Cardiac, of which Professor Bullrich is director. This institution, which is a voluntary one and has been running for three years, undertakes the care of pregnant women, nursing mothers and children with cardiac lesions, promotes the organisation and equipment of dispensaries and colonies for their treatment, and puts forward legislation on behalf of work-people with heart disease. At a congress of the institution recently held in Buenos Aires it was urged that clinics for heart disease should be established in the Argentine such as already exist in Britain and the U.S.A. Dr. Luis Sabathie, who has lately published an extensive monograph on the subject, emphasised the inadequacy of purely medical methods in treatment. One remarkable statement made by subsequent speakers was that 70% of anarchists and other revolutionaries suffer from some physical disability which prevents them from following a normal calling.

WOMEN CONFER ON INDUSTRY

THE second session of the London Women's Parliament, held on Oct. 27 at the Conway Hall, was attended by 371 delegates representing 211 groups, which included coöperative organisations, guilds, trades unions, discussion groups and education committees. Mrs. NAN MCMILLAN, recently president of the National Union of Women Teachers, took the chair.

Miss MARY CORSELLIS, the organiser, was able to inform the meeting of the results of the first session. Improvements had been reported from factories to which the L.W.P. had sent delegates. The Parliament had been recognised by the Minister of Labour; suggestions on milk rationing and the differential distribution of oranges had been adopted. An investigation of conditions in factories had been carried out and an inquiry into the provision of day nurseries and into school feeding was foreshadowed.

Discussion at the second session ranged over a bill to regulate supplies and distribution of food, and a series of proposals designed to remove the obstacles now preventing women from playing their full part in industrial production.

The speakers were lucid and brisk, much more concerned with facts than theories. Among them were councillors, teachers, transport workers, ambulance drivers, clerks, housewives, nursery school supervisors, canteen managers and workers from clothing, munition and aircraft factories. They had many abuses to point out, but there was a striking growth, during the meeting, of the conviction that it was not by individual and intermittent grumbling that these could be remedied, but by the deliberate and combined action of the women doing the jobs. The factors held to be largely responsible for keeping women from keen participation in the work of production were low wages, insufficient day nurseries, long working hours and consequent shopping difficulties, bad canteens and inadequate transport.

WAGES AND WORK

Of these perhaps low wages received least attention in the discussion, although the hardship caused by this factor is sometimes great. Some girls under 20 are unable to earn a wage on which they can get enough to eat. In most factories women are paid much lower

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wages than men; thus inquiries made by the organising committee in a large number of factories showed that a woman in engineering now earns a minimum of 38*s*. In Government training centres this is the starting wage, and after three tests she gets 47*s*.; a man earns 22*s*. 6*d*. more throughout the training course. When a woman leaves the centre and starts work in a factory she drops back to 38*s*. plus a bonus for piece work; but in explosive factories many processes are too dangerous for piece work. The average earnings for an adult woman in engineering today are below £2 10*s*. (equivalent to 39*s*. before the war). When she has paid for food, lodging and transport she may find herself only a few shillings in pocket at the end of the week. If she has to contribute to the care of her children, or send money home to her family she may have less than enough for food. National Service officers have been obliged in some cases to release a woman from nationally important work on the ground that the pay did not enable her to support herself. This is made worse by the fact, which came out clearly in discussion, that many women, though trained for and capable of skilled work, are being used in factories as cheap labour to do routine jobs which could be entrusted to a newcomer, and are thus being prevented from earning higher rates of pay.

Miss G. ROWLAND, speaking of the large engineering factory at which she works, said there was no collaboration between the Government training centres and the factories. Women trained as toolmakers would go to the factories and be set to work on some other task. She estimated that 50% of women fail to get employment in the job for which they have been trained; and recently workers at her factory had decided to arrange a small conference between delegates from the factory and instructors from the centres to discuss better collaboration in the district. Miss NORAH BROWN, a member of the organising committee of the L.W.P., pointed out that there had been a 33% increase in fatal accidents in factories in the past year. Some of these are doubtless the outcome of fatigue due to long hours—a ten-hour day and a 56-hour week is common—some to lack of training; but an increase in legal penalties for such accidents, she thought, showed that the management had been responsible for some.

FOOD AND SHOPPING

The hours worked make shopping problems serious for women. Mrs. HANSON, a transport worker, said that in Birmingham women employed in the factories only had Saturday afternoon on which to do all the buying-in for the week; the shops were then so crowded that many of them could not even buy their rations. The city council, when approached, said that this was a national problem, and that they could do nothing until some national plan had been devised. In Finchley it seems they are more progressive; there, Councillor Mrs. DIANA PYM said, the food committee has organised passes for women workers so that they can get their proper share of goods in the shops. She suggested that shops might arrange to stay open later on one night a week. The problem of shopping would of course be much eased if there was more provision for communal feeding and for school meals for children. The topic of school meals was very close to the heart of the meeting. Mrs. MARY MARSTON pointed out that they were especially necessary where the mother went out early to work at the factory; she dared not leave the children alone in the house with a fire burning, so she usually brought them along to school. They hung about, turning somersaults on the railings and getting rather cold, until school opened, and then had nothing to look forward to at lunch-time except a sandwich of doubtful ingredients—and "no little bit of pudding." Other speakers agreed in disparaging such "nosebag meals," and all felt that the Government should be pressed to carry out its promise of universal school feeding.

The lack of day nurseries, however, was felt to be the paramount factor keeping women out of industry at present. Mrs. CARTER, of the Society for the Provision of Nursery Schools and Day Nurseries, said that local authorities had the power to set up nurseries but many of them had not done so. They thought that mothers could always find a neighbour to look after children; such authorities, she said, were inexorably "minder-minded." The society was working hard to get more nurseries set up, and much was to be hoped from the conference on war-time nurseries to be held under the chairmanship of Lord Horder on Oct. 29.

CANTEENS AND HYGIENE

The need for good canteens was also discussed freely. Again much turns on the confidence existing between the management and the workers. Some employers provide no canteens, some hand the canteen catering over to a contractor who makes little attempt to provide good food or serve it tolerably. In other firms the workers take a share in running the canteen and can see to it that the food and service are good. Mrs. TOWERS told how she had worked in a West Country factory where a canteen was ultimately provided after much pressure; but the food was uneatable and she finally found herself doing 12 hours a night, seven nights a week, and travelling an hour each way, on a diet consisting largely of tea and cigarettes. Faulty diet of this kind cannot fail to cause ill health and absenteeism. Poor hygiene in the factories must add to the danger; little was said about this during the discussion, but investigations by the organising committee show that ventilation and heating are grossly defective in some factories and that toilet facilities may fall below the level of the most elementary hygiene and decency. Thus in one factory three basins are filled with hot water in which 60 girls have to wash their hands; in another there were recently 200 cases of impetigo, and a department employing about 200 had five washbasins and four towels; in another girls have to ask for a pass to go to the toilet and there is no ventilation in the lavatories, which are permanently blacked out.

The session passed unanimously the bill to regulate supplies and distribution of food by registration and rationing, control of prices, school feeding, and by the provision of canteens and communal kitchens.

In England Now

A Running Commentary by Peripatetic Correspondents

THE student of human nature who wants a new field for observation should try the wardroom of one of H.M. ships in war-time. Excluded for months on end from all normal associations—from the good earth (whoever has experienced the nostalgia for a patch of land in which to dig, bred by months of unrelieved seascapes, can understand the popularity of gardening among sea-going men), from trees, animals, weather that could be remotely related to a modest idea of summer, and above all from the companionship of the opposite sex—members of the mess settle down each to an individual level, some giving more in one way others in another, and a few taking more than they give. I fancy they all go through a cycle, almost as regular as the menstrual one, of depression followed by elation, each phase of depression always lasting for the same number of days. There are some people whom nothing seems to shake, and who are nearly always ready with a smile and a joke; and yet occasionally when off their guard they too seem a little less ready with their banter than usual. Once in a blue moon there comes the big day when it is possible to entertain for an hour or two some of the ladies of E.N.S.A. who so heroically come to the most outlandish places to cheer the troops. The change in atmosphere on the morning of the party fully justifies Freud in assuming sex to be the root of all behaviour. The mess is split into three parties. There are the less junior members who have a wife and family tucked away somewhere and who are not really in the running: "But if we were, by Jove . . . ." You have to watch this lot pretty carefully or they will have sneaked her away into a corner before you have had time to get your cigarette-case out. Then there are the quiet, introverted kind who will probably take a bad fall if they have not done so already, and who will probably marry late. They enjoy the party and hand the drinks round beautifully, but do not get a chance to develop an attack in the short time and limited field available in the wardroom. The third type is the thorough extrovert who makes, in a specified time, more noise and greater impression on the target than anyone else; they remind one of a barrage from the close-range weapons. They usually sweep the girls off

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their feet at the first encounter and beat off all opposition for the duration of the party.

Alas, the ladies have come and gone. Tomorrow we shall be back to our old selves again and the difference will be as that between leavened and unleavened bread. I think I know to which of the last two groups I belong, but it must be time for a change. All I got was a glimpse of a blonde head and a well-turned ankle and a good view of the back of the Commander's neck.

* * *

The course of propaganda never did run smooth; in an evacuee hostel it becomes a kind of switchback, even though you have the ear of your public and were once a doc yourself. At our hostel two cases of diphtheria broke out at the end of June, within a day or so of each other. One of the patients was a twin, and both of them were called Angela, so that a general air of confusion must be expected in this account which can only be distinguished from "The Comedy of Errors" by differences in style. Well then: the twin, Angela A. aged 5 had been immunised with her sister four or five months before, awkwardly enough; and she had had no known contact with a case of diphtheria. But Angela B. aged 6 had only been back for a few days after four weeks in hospital with scarlet fever. We had already had a stormy time with scarlet fever, so we were glad enough to submit to a full-dress investigation. Throats were swabbed and offers of immunisation were scattered broadcast. Angela A., however, had shaken the confidence of our mothers. Had she not been immunised and had she not "got it" after all? She had. They shook their heads at our glib arguments, pinning their judgment to facts as inopportunely represented by the case of Angela A. Only 8 mothers out of the 30 thought our guess was better than theirs and allowed their children to be immunised. The swabs all came back negative, and there were no more cases until the two Angelas returned from hospital, 6 weeks later. Ten days after the return Angela A.'s twin sister, Brenda A. developed symptoms and was sent to hospital. Here was a smack in the eye for propaganda. The medical officer of health came and took swabs of Angela A.'s throat, and the Klebs-Lœffler bacillus was grown from her postnasal discharge. Back she went to hospital. Rather sheepishly we brought up the topic of immunisation again. The mothers didn't think a lot of it; they were too polite to say so, but they sniffed rather eloquently. But help was on the way. Angela A. had sunk us, but her twin Brenda, with a nice sense of fair play, threw us a lifebelt. She came home in a fortnight, never having had a positive swab. This was a test case, and one which nobody could sniff at. Twins, I mean, everyone knows how ready twins are to catch the same thing; and then Angela and Brenda A. had been inseparable after Angela came back from her attack in hospital. If Brenda hadn't got it, it must have been because of that immunisation. It was as clear as mud. I began a telling campaign based on these arguments, and went on to talk of winter—blackout—close quarters—closed rooms. Gradually they came round, and now, at the beginning of October all the children are in the thick of being immunised, and we have had no more infectious cases. That's a bit of luck.

* * *

What are the motives behind the thousands now being bled to help stock the blood-banks, and the tens of thousands who await the call? And what do they imagine happens to them when they are bled? Some enrol to experience something new, others because they think, or their doctors have told them, that they suffer from blood-pressure, whereas a very few are actuated by the desire to secure the interest and possible admiration of their circle; the vast majority, however, are moved by loyalty to their country's cause and a genuine desire to give their blood because it is needed. Most of the volunteers are phlegmatic and their desire to serve costs them little in anxiety or discomfort. But an important minority must resolve conflicts and overcome fears and doubts before reporting for duty, and these deserve the full sympathy of the phlebotomist. In peace-time they are represented by those relatives who loathe nothing more than the thought of giving blood and who would never volunteer were it not for a loved one in need. Some of the volunteers, who have had no opportunity of discussing the matter with one who has been "blooded," imagine that an artery will be opened in the arm and that the blood will be caught in some sort of vessel (presumably on the down-throw); later, stitches will be put in (if the bleeding *can* be stopped) and the exsanguinated victim will be sent home in the hopes that new blood will be made during the week-end. It says a lot for the altruism of these apprehensive realists that they have steeled themselves for the ordeal. In small towns, the dangers of giving blood are often magnified by stories circulating of oozing which the doctor could not stop, of bleeding which recommenced that night in the pictures, of faints at the tea-table, of lumps in the arm, of "the septics" and of all manner of conceivable ailments attributed to blood-letting. On the other hand, some expect an operation as trivial as the grouping test—"I find my bus doesn't go for another twelve minutes so I thought you might take my blood now."

The introspective volunteer will arrive at the centre with a dread of experiencing pain (often they compare their feelings to those experienced in the dentist's waiting-room), a fear of seeing blood, especially his own, and of making a fool of himself in the presence of others. In case our donor-elect happens to be of this stamp, one cannot expend too much thought and care on him when he is called on for the first time. It is a natural and deeply rooted instinct to feel faint at the sight of one's own blood, and even the thought of it will cause some people to feel squeamish. It is, therefore, an injustice to resent the attendance at the bleeding centre of those who are not very stable in their vasomoter systems, and to regard them contemptuously as "neurotic." The fainting is a "protective" reflex, for the consequent fall of blood-pressure helps both to lay the subject flat and also to arrest the hæmorrhage. It is as well to satisfy oneself that the volunteer is in good health and willing: the fact that the candidate was well on enrolment two years ago is no guarantee that he or she is fit to be bled now. We find it adds enormously to the comfort of the donor if he receives a small intracutaneous injection of procaine prior to the insertion of the "donor" needle. The two who in error received an injection of sal volatile were presumably of the phlegmatic type or they would have complained: or can this diffusible stimulant have anæsthetic properties yet to be explored? It was only when we set about reviving a colleague's wife with a tot of procaine that we realised that the dispenser had put up both these substances into similar bottles.

How grateful we are to those who perfected the present M.R.C. needles and the bottle with its fashionable waistline! A wider neck, perhaps, would have been preferable, being more readily adaptable for bottling gooseberries during the close season for blood, but otherwise we have no complaints. It is unnecessary, and uncomfortable for the donor, to employ too great a pressure on the sphygmomanometer cuff. While the needle is being introduced through the anæsthetised spot an initial rise to about 50 mm. Hg is desirable and the donor should be told to squeeze a bandage or a one ounce screw-capped bottle in his fist. As the blood begins to flow, the pressure can be lowered to 30 or 20 mm. and it is surprising how often no pressure at all is needed, even if the donor has partially relaxed his hold on the bandage or bottle. Some of our volunteers turn the scales at fifteen stone, while others are barely seven. It is unfair to bleed them to an equal extent. The maximum donation should be 420 c.cm., and some subjects are best cut down to 300 c.cm. or even less. In these days everybody is an allotment holder and a fire-watcher, in addition to doing more than an ordinary day's work. The bone-marrow tax, therefore, should not exceed 5–7% and it should be collected at the most convenient time for the taxpayer—after business hours, or on Saturday afternoons and Sundays.

* * *

"Doctor, here's your hat!" A book of medical reminiscences was published by an American doctor a few years ago with this engaging title. I did not read the book for I knew that, for me, the title was all. How many times has my decrepit tile been handed to me with these words. A lady arrived at the nursing-home for her confinement with my hat among her luggage, and refused to return it to me until her baby was born. Black hats in her system of hagiology were lucky; even

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my promise to find her a black cat in exchange was of no use. It had to be a hat, it had to be a black hat and it had to be mine. If this was my hat's strangest experience it has had another more humiliating. One of the difficulties that a doctor has about a hat is its safe lodgment in his patient's house. Too few halls are today decorated with a hat-stand or even a hat-rail. The hat, however, must be left in a position that is at once obvious and unobtrusive; the staircase lintel, if such there be, is the position of choice. "I will look in to see David again on Tuesday, Mrs. Jones," with one's hand travelling lightly down the banister, "I'm sure that by then we shall find him (ah, yes, this is mine," as one's hand comes directly against a familiar object) "very much better." Nothing could be more simple and one is on the doorstep, hat in hand. The lintel absent or inadequate, it is necessary to look around for another lodging. It was thus that I was one day searching a hall when I saw a coffin-like glass case in which fish of varied colours were swimming. I trustfully put my hat on the top of this miniature aquarium. I was mistaken, for its sixth and upper side was open to the air. My hat was rescued by the proprietor just before it completely submerged, and was returned to me with a goldfish inside. This problem will in any case be solved by the too swift passage of the summer, for the doctor who can put on his overcoat and leave his hat behind him must suffer from amnesia to an unusual degree. Three further clinical points about this interesting disorder. It must be of recent origin, since any late Victorian or early Edwardian physician who walked down the garden-path without his silk hat on his head must have suffered irreparable loss of prestige. Secondly, the malady is not entirely specific since it may embrace other objects; such as stethoscopes and ophthalmoscopes. Thirdly, in advanced cases the symptom may be displayed in unusual circumstances. A few days ago the gardener brought in a forage-cap which he had found lying at the foot of some raspberry-canes. He had his theories about this cap. One was that the cook, his friend, had been receiving the licentious soldiery in the summer-house; the other that the thieving, scrounging so-and-so's had been after his peas. My wife restored calm when she recalled that a few nights before I had put on my Home Guard uniform for the first time and had mowed the lawn in full kit to accustom myself to these unusual garments. The night was warm, the grass was long, the mower was stiff and I was sweating uncomfortably round the forehead. I discarded my convict cap. Thus a few days later it was held in front of me, a poor shrunken thing. "Major, here's your cap!"

* * *

The autumn health publicity campaign of the Ministry of Health has begun, and great things are promised us: H. M. Bateman in his posters and Arthur Askey in his comedy film can be relied on to do their stuff, and there are to be window displays and talks by the B.B.C. But on the literary side, it seems, there is to be no high art, just three very plain statements hardly worth the name of slogans—"Coughs and sneezes spread diseases. Trap the germs by using your handkerchief. Help to keep the nation fighting fit." Not very lively, are they? And unless we use paper ones, which are scarce these days, it seems to me that our handkerchiefs will merely trap the germs temporarily and release them later on the unsuspecting housewife or maid at the wash tub. So as an unofficial Poet Laureate, spurred to action by grave current events, I submit the following metrical version which may point the way to saving a deserving life without mentioning any particular brand of disinfectant.

Coughs and sneezes spread diseases.
Trap the germ before it seizes;
Do not think our slogan cranky,
Wrap the devil in your hanky.
So you'll keep the nation fit,
Able then to do its bit,
Healthy, well and superhuman—
All except the washerwoman.

* * *

It surprises me that no peripatetic correspondent has commented on the unique position which the cigarette holds in these troublous times. Though it cannot be counted as foodstuff or munition of war it has gained for itself a special controller, a special commission to buy supplies from abroad, and a special place in the Lease-lend Act. I have read or heard the number of millions of cigarettes that are smoked every day and the thousands of tons of tobacco that are imported every year, but having no memory for figures I have made my own calculations. If, I said, one in twenty of the population smokes cigarettes (surely a modest estimate) and the average consumption per smoker per day is 5 cigarettes (again a modest estimate), then some 10 millions of cigarettes are smoked every day which at 1*s.* 6*d.* for 20 means £37,500 going up in smoke daily. Now, there is little doubt that the cigarette has become an integral part of our social system. It serves as introduction to strangers on a train journey; it breaks the icy awkwardness among distant acquaintances assembled for a meal; it is the hall-mark of the gentleman when the meal is over. If you cannot produce a well-stacked gold or silver cigarette-case, or worse still, if you refuse to have one from such a case, you are suspect for the rest of the evening. The cigarette relieves the monotony of a tedious day (many a man never smoked till he joined the army); it soothes the distracted mind; it allays the pangs of hunger; it may even, according to our scientists, disinfect the air we breathe. And when all its virtues have been extolled, we have to admit that smoking is but a bad habit—a habit which can usually be broken without detriment to the habitué, a habit which many folks never acquire and are none the worse for the lack of it. For some it is a form of worship which, like church-going, they cannot do without, but for most of us it is a self-indulgence which with a little effort we could well give up. We might even class the smoker with the road-hog who uses petrol for pleasure, but would that be hitting at the liberties of the British workingman? Some smokers defend themselves by pointing to the revenue which tobacco brings in, but in these days when every inch of shipping space is needed for commodities to beat Hitler that is a poor excuse. May I add that I confess to a sneaking envy and admiration of the pipe-smoker? The only thing about him that riles me is the time he wastes in filling his pipe. Now whisky is quite another kettle of fish; it is home-produced, is nine-tenths tax, and only the very rich can consume too much of it, so that to drink the stuff is a real act of patriotism. Being a Scotsman who has lately forsworn the weed, I am like to be overflowing with virtue and good spirits.

On the related subject of food, I'd put the "grow more vegetables" campaign among our few triumphs—so far—of this war. I don't know how much extra food it has produced, but it has sent many of us townsfolk back to the land to discover or re-discover the virtue of digging up mother earth. It has been a hobby and a mind-healer as well as providing the physical exercise that the indoor worker needs; it has also been a great leveller, giving employer and employee a common bond of interest. It has even supplanted "shop-talk" when members of our fraternity forgather. I wonder if they cultivate the allotment and vegetable patch in Germany.

BRITISH HOSPITALS ASSOCIATION

Sir Bernard Docker had a cheering statement to make at the annual meeting of the association on Oct. 24. For the first time the association is distributing money. As the agent of the Government it is remitting the 50% grant of the additional salaries being paid to the nursing staffs of the hospitals (*Lancet*, Sept. 6, p. 292). The council have adopted a statement of policy explaining the relationship between the association and the Nuffield Provincial Hospitals Trust, which is largely an attempt to define terms. Wherever practicable the term "coördination of hospital services" will be used instead of "regionalisation." The association is calling its erstwhile regions "areas" and will try to make their boundaries conterminous with those of the Nuffield "divisions." Areal committees will deal with the special problems of the voluntary hospitals apart from those they have in common with the council hospitals. Sir Bernard regretted that legislation had not put upon voluntary hospitals a share of the responsibility for providing hospital accommodation. Sir Bernard also spoke of the anxiety felt by many hospitals about the shortage of staff owing to the refusal of the Ministry of Labour to regard hospital work as war work. His remarks were strongly endorsed in the discussion which followed and it was even suggested that some hospitals might have to close because the necessary lay staff was no longer available.

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Parliament

FROM THE FLOOR OF THE HOUSE

MEDICUS M.P.

IT was in the first year of this world war that I left the House, in June, 1940, to be precise, and it is in the third year of the war, in October, 1941, that I return to this column. Not that Service commitments kept me away from the House entirely—it is laid down in regulations that an M.P. shall get leave to attend to his parliamentary duties—but such visits as I could make were different. The House to which I return is different too. A Service colleague saying good-bye to me said, "Well, keep 'em up to it. We support the Government, but no-one is infallible." The House I left in 1940 had just rallied to the new Government to meet a mighty shock—the House to which I return in 1941 is remaking the forms and procedure of the House to meet the circumstances of a war in which Parliament is a chief of the forces fronting the enemy. There is active and constructive criticism. There is provision being made, for the first time in modern parliamentary history, for the taking of votes and recording the division of opinion when the House is in secret session. There is criticism of the somewhat clumsy expedient of an official non-Government spokesman speaking from the "Opposition" bench (which supports the Government) so as to carry out the "opposition" duties without which the parliamentary machine does not function. There is an incisive bite in many questions put to ministers in which a real opposition, in matters of detail, expresses itself. But out of details in Parliament spring principles on which Governments may be attacked.

* * *

There have lately been several occasions in Parliament in which the voice of criticism has reached full opposition strength—but not an opposition on party lines. A debate on proposed changes in Service pay and dependants' allowances introduced by Sir Walter Womersley, Minister of Pensions, and supported by Mr. Wilfred Paling, the parliamentary secretary, was received with a unanimous chorus of fierce criticism from Labour, Liberal and Conservative alike. The House wanted a straightforward increase of dependants' allowances. The Minister offered an increase of grants to be made through the machinery of the Unemployment Assistance Board. This lining up of Army and other Service dependants outside the offices of the U.A.B. appealed neither to Viscount Hinchinbrooke in the uniform of a Midland regiment, nor to Miss Ward, a member of the War Grants Committee with an expert knowledge of all the details of the grants, nor to Mr. Dobbie, another member of this committee.

The Minister tried to bluff it out and his parliamentary secretary backed him up but, most astonishingly, Sir Walter Womersley said, in a broadcast the same evening, that the proposals were received by Parliament with "general approval." Chase my parliamentary secretary round the Speaker's chair—as Mr. Nat Gubbins, M.P., might say! Briefly this scheme for dependants was rejected by the mass opinion of the House on the ground that it was administratively unworkable and that it was unjust. The Minister still smiles about it in public—but behind the scenes desperate efforts are being made to evolve something more acceptable—and the House is not likely to be complaisant. And ministers can be changed if necessary.

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Another occasion was a debate on the refusal by Mr. Morrison as home secretary to allow Mr. McGovern to visit North and South Ireland. Mr. McGovern is a member of the Maxton party of three who are against the war but who state that they are anxious to do nothing to impede the war effort. One of Mr. Morrison's reasons for the refusal was that he did not consider that Mr. McGovern's visit to Ireland "would be helpful" to the national effort. But is it Mr. Morrison's business to decide that? It was argued, by the Conservative M.P. who brought the matter up before the House, that this was not Mr. Morrison's business—that it was essential to the M.P. to be as free and unfettered as possible in carrying out his duty as an M.P. The criticism of the Home Secretary by all parties in the House was so hostile that the Prime Minister had to come to Mr. Morrison's rescue. And there was an uneasy questioning about whether there was "any danger of a division," not in the House, but in the lobbies outside.

No matters of this kind touch on the House's support for the Prime Minister: he stands head and shoulders above all his ministers in the cabinet and out—indeed it is a pity some of them are not taller. As criticism develops—as a result of the revelations of the Gort dispatches, as a result of criticism with regard to British aid to Russia, and as a result of other matters which crop up—individual ministers' reputations may be damaged and they may even be dropped. But the Prime Minister strengthens his hold on the House.

* * *

One disadvantage of the McGovern debate was that it cut down a debate on the health of the nation to a half-day. Mr. Ernest Brown had recently made a statement on the inquiry to be held on the relations of voluntary and publicly controlled hospitals in the future. A useful piece of work, but not of priority importance at the moment. Medical man-power, the rise of tuberculosis and its relation to the conditions of war-production, and existing epidemics of typhus in Europe are all of greater urgency. The interim report of the Shakespeare committee on medical man-power, which has been written but not published, is known to be a purely interim proposal for the setting up of regional committees. The setting up of a method of close coördination of all branches of medical work in the war will need to be pursued by other and more vigorous means if this is to be effective. One of the speakers in the debate was Prof. A. V. Hill, who spoke in favour of a state medical service without defining the machinery of the service. The B.M.A. Medical Planning Commission, PEP, medical and health committees of other organisations and much discussion in committees in and around Parliament are all considering the problem of the health and medical service of the nation. And in the new parliamentary session—the present session is ending shortly—a larger scale debate on health and medical questions is to take place.

It is hoped that this debate will give opportunity for consideration of the health aspect of food rationing, of the increase of health services in war factories and generally of how to keep the nation—as one member said in the last debate—fighting fit for the work of production.

Our Nutrition Policy

In the pleasantly informal atmosphere of the luncheon hour, on Oct. 21, Lord LISTOWEL in the House of Lords gave the Government an opportunity to describe how they were safeguarding the children's food in war-time. The problem was not controversial but it was urgent. The Government's milk scheme and school meals were our new antidotes to poverty and malnutrition, and Lord Listowel hoped they would become no less permanent a feature of our social services than free education. Indeed teachers have discovered that a school meal is a practical demonstration of character training and dietetics, and is as valuable as regular classes or organised games.

Lord WOOLTON said that war had altered the whole nature of the nutrition problem. As a result of the equalising effect of the ration book the nation was living on a diet which was based on the average needs of the family. But it was not designed to meet the needs of special classes of the community and there was some danger that those who required special consideration, either for the growth of their bodies or for the maintenance of more than average physical strength, might find the ration-book diet insufficient. At present there were 5 million children in the elementary and secondary schools and only 300,000 were receiving meals in school. The provision of school meals was uneven: in a few areas, as much as 30% of the children were having meals in school, in others there was little or no provision. Not all local authorities had realised the implications of the war-time diet scale, and there was no doubt that many had met with difficulties regarding equipment, premises and finance. Yet in some areas up to 50% of the parents would like their children to have dinners in school, and are willing to pay for them.

The Chancellor of the Exchequer had now agreed that from Oct. 1 the grant in respect of the provision of meals

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for children attending public elementary schools was to be increased by a further 10%, with an overriding maximum of 95% of the loss incurred. The minimum rate of grant would now be 70% and the average rate approximately 80%. Priority supplies would be provided to enable school canteens to serve balanced meals of the type which medical and scientific advisers considered necessary for the growth and health of school-children. These provisions would apply to all schools. The cooking depots for use in emergency, which had been set up by local authorities and were now lying idle, were to be brought into action now, and kept bright and polished in the daily service of the children of the nation. They were capable of providing 300,000 meals a day, and the number would be increased to 400,000. British Restaurants and emergency meal-centres would also play their part, and their equipment, subject to suitable safeguards, would be used, and where it was necessary to start new kitchens equipment would be available from the Ministry's pool. The President of the Board of Education was seeking to raise the proportion of children receiving milk under the milk in schools scheme from the present 60% to as near 100% as possible. To this end the whole cost of providing free milk to necessitous children and handling the milk in the schools would be reimbursed by the Exchequer.

So much for children. But, Lord Woolton pointed out, we have not only to preserve life but to defend liberty. The principle adopted to secure the health of children—to see that they should be fed where they were congregated—had also been adopted for industrial workers. Canteens would be divided into three groups, according as they catered for the heavy worker, the medium-heavy worker and the sedentary worker, and the Government would provide the appropriate food accordingly. Before the end of this year 85% of the mining population would have a supplementary ration served at the pit-head.

Lord HORDER, in welcoming the Minister's statement, said that so far no overt signs of malnutrition were to be seen among our people, but if we delayed until malnutrition appeared we might have waited too long, for malnutrition left a permanent scar. Evacuation had undoubtedly acted as a deterrent against deficiency diseases in children, because sun and air were essential in preserving nutrition. But we did not know how far our children might be from malnutrition; for science could not measure the margin of safety. Children were at the mercy of chance in any rationing scheme, for with most mothers knowledge marched a good way behind affection, and school was the only place where defects might be made good and hazards warded off. He felt that this was a red-letter day in the annals of children's nutrition. Everybody must help and they must aim at as many meals as possible in as short a time as possible.

The Battle of the Books

The Minister of Information lately said that ink has done much to sustain and improve the modern social system. It is the staple of freedom, knowledge and entertainment. But ink can do nothing without its colleague paper, and Lord SAMUEL received warm support in the House of Lords on Oct. 23 when he pleaded for some indulgence for the publishers of books. Noble Lords seemed to feel that paper-saving might well begin in Whitehall. Entertainment and education are part of our war effort and the public are seeking both today from books in a greater measure than ever before. Libraries and universities are unable to obtain school books and technical books which they have ordered, and Lord HORDER sent a message to say there is an urgent need for the release of paper for printing books for the doctor, the medical student, the nurse and the civil defence worker. He gave as an example from his own knowledge an excellent book on first-aid which is out of print and cannot be reprinted for lack of paper, and added that the "chaotic state" of the printing and binding trades are causing from 4–6 months' delay in the publication of what books there is paper for. Knowledge of science could not be maintained unless there are books to feed it. Lord SAMUEL pointed out that the paper used for books is obtained from home sources and is only 1·5% of what the country uses for other purposes. We must concentrate on the war, but what are we fighting for, Lord Samuel asked. We are fighting for the intellectual and spiritual things which we value and it would be a tragedy if they were to be trodden under in the fight. The Archbishop of CANTERBURY held that we cannot be effectively at war unless we are sometimes prepared to get outside it and above it, and for many books were the easiest means. Restriction of paper unfortunately by no means meant that only the best books were published. Lord ESHER thought that the publishers had perhaps not done all they might to solve their labour problems. Lord ELTON said that the books we exported project Britain abroad, and declared the least pretentious book was a better form of escapism than alcohol or astrology. He warned his listeners that a too severe restriction of paper might easily slide into a kind of censorship. Lord SNELL replied for the Government regretfully, but said the book trade had received more favourable treatment than newspapers or periodicals. He admitted his own indebtedness to books and looked forward to the day when they would once more provide unrationed nurture for our times. Lord SAMUEL thanked him for the spirit rather than the substance of his reply and acclaimed him as a literary Doctor Jekyll and an official Mr. Hyde.

QUESTION TIME

School Meals in Scotland

Replying to a question Mr. T. JOHNSTON said: I hope to secure an immediate and substantial development of school meals service by arranging for advantage to be taken of facilities provided by the Minister of Food, and where these are not available by encouraging education authorities to make their own provision. The financial aid available to education authorities is being increased. Parents who are able to pay will be expected to pay. Scots Law presently permits food to be provided for necessitous children only when the child is unable by reason of lack of food to take full advantage of the education provided. But malnutrition should be prevented, and a short bill, designed to give education authorities power to supply food free of charge to necessitous cases without waiting for evidence of malnutrition, will be introduced in the near future.

Tuberculosis in Scotland

Mrs. A. HARDIE asked the Secretary of State for Scotland in what districts in Scotland the increase in notified cases of tuberculosis had taken place.—Mr. JOHNSTON replying gave the following figures:—

1938			1939			1940			1941 (first 41 weeks)		
Pul.	Non-pul.	Total	Pul.	Non-pul.	Total	Pul.	Non-pul.	Total	Pul.	Non-pul.	Total
4793	2772	7565	4657	2440	7097	5200	2504	7704	4548	1988	6536

Pul. = pulmonary.

Infant Mortality in Scotland

The latest infant-mortality figures available for Scotland are those for the first six months of this year. Comparing these rates with the average of the rates for the first six months of the three years 1937, 1938 and 1939, the burghs showing the largest percentage increases are Dumbarton, Rutherglen, Hamilton and Paisley. Considerable increases are found in the counties of Nairn and Sutherland, but the small number of births in the first six months of 1941 renders any comparison unreliable. (Mr. JOHNSTON replying to Mrs. HARDIE.)

War-time Nurseries in Scotland

Ten local authorities in Scotland have submitted definite proposals for the establishment of war-time nurseries, and these proposals, which provide for 39 nurseries, have all been approved. Of the 39, there are 2, each accommodating 40 children, in full operation, and 14 which were already in partial operation at the date of the circular are being brought into fuller operation. (Mr. JOHNSTON replying to Mr. MCNEIL.)

Deaths after Vaccination

In reply to a question the MINISTER OF HEALTH stated: the deaths of children under five assigned to vaccination numbered 5 in 1938, 1 in 1939 and 6 in 1940; but I am advised that this classification does not rule out the probability that such deaths may have had other contributory causes.

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Registrar-General's Reports

Sir ERNEST GRAHAM-LITTLE asked the Minister whether he would secure the resumption of publication of the Registrar-General's Reports, cessation of which constituted a serious handicap on medical research, and was successfully avoided in the last war.—Miss F. HORSBRUGH replied: The preparation of these reports has not been discontinued, though it is regretted that war-time conditions have delayed the completion of the report for 1939. It has been decided, however, to print in the first instance a very limited edition of this volume which will be held by the Registrar-General and made available for consultation and study by Government departments and other bodies or persons having an acknowledged interest in its contents. The interests of medical research will receive sympathetic treatment under this arrangement.

Doctors for Pensions Appeal Tribunals

Mr. W. W. WAKEFIELD asked the Minister of Pensions if, in view of his recent undertaking that he would consult the Minister of Health as to the supply of doctors for pensions appeal tribunals, he could now state what was the present position.—Sir W. WOMERSLEY replied: I have stated that I shall keep the matter of pensions appeal tribunals constantly in mind in the light of the findings from time to time of the Shakespeare Committee. I am asking that committee to give me their views on the availability of suitable doctors for appeal work.

Hospital in Antigua

Dr. H. B. MORGAN asked the Under Secretary of State for the Colonies whether the Colony Hospital in Antigua, British West Indies, was still in the state it was in February, 1939, badly in need of repair, with rotten floors, leaking roofs, broken doors and poor sanitation; whether temporary repairs had yet been done; and when it was proposed to rebuild the hospital properly so that good medical work for the island inhabitants might be done.—Mr. G. HALL replied: Owing to the financial position of the colony it has only been possible in recent years to effect the minimum running repairs to the Holberton Hospital in Antigua. The question of rebuilding the hospital, which is agreed to be necessary, has been considered by the comptroller for development and welfare in consultation with the governor. Plans will be drawn up by a qualified hospital architect now in the West Indies. This architect will shortly be undertaking a survey of hospital buildings in the Eastern Caribbean colonies and British Guiana, financed by a grant under the Colonial Development and Welfare Act.

Medical Board Rejects

Sir ROBERT YOUNG asked the Minister of Health whether he was aware that many men were turned down for the various forces by the medical boards on account of physical disability, and placed in class III or IV; and whether he would consult with the War Office, in the interests of the future health of the nation, so that each man should be informed of his particular physical disability, when if it was anything requiring attention he could consult his own medical doctor or officer.—Mr. E. BROWN replied: I will communicate with the Minister on the matter.

BEE STINGS.—Mr. S. B. Ralston of Bearsden, Dumbartonshire, writes: I have worked with bees for some 20 years, using a veil but with bare hands, and therefore have a large experience of stings. A moderate number of stings have little effect, except a slight local redness and later itchiness, with no swelling; but 20–30 stings have had a more severe effect, and recently even fewer than 20. The effects are, successively: (1) a feeling of heat and stuffiness inside the veil; (2) increasingly heavy pounding of the heart; (3) rush of blood to the head, with bloodshot eyes; (4) a sick feeling but no vomiting; (5) giddiness tending towards momentary unconsciousness; (6) gradual recovery with profuse perspiration; (7) nearly full recovery in about two hours. The attack itself seems to take a long time, but actually is only a matter of minutes. The procedure I adopt is to lie flat on my back with my head slightly raised; I do this at once in the garden, but well away from the hive. Then when the giddiness is over I go indoors and take a warm bath and get a very necessary change of clothing. Finally I sleep for an hour or two.

Letters to the Editor

MALNUTRITION IN THE COLONIES

SIR,—You have drawn attention to the subject of planned nutrition for our Crown Colonies in your leader of Oct. 4, and I hope you will go on turning a kindly eye on this subject for the benefit of the less well informed at home. Little was really done before the war, though the Moyne Commission brought out the appalling state of nutrition in the West Indies, one of our oldest colonies. In Africa, medical development has largely been due to the keenness of individuals rather than to a defined nutritional policy. This is borne out by the dearth of nutritional appointments and of postgraduate training facilities, and by the lack of standing committees directed to the study of nutrition. Nor have educated Africans taken much share in a problem which is primarily their own. A more active policy was being foreshadowed at home before the war in the Colonial Advisory Report no. 1. Report no. 2, which was that of the colonies themselves, showed how little active concern for nutrition they had displayed up to that time. The work of the Medical Research Council, Dr. Platt's visit, and the proposal to establish research scholarships before the war all show awakening interest. Credit for what has been done so far, however, must go largely to men like Stannus, Lowenthal, Pillat and Wilson, who spent the greater part of their lives in Africa and contributed much of what is known about tropical malnutrition. They knew their environment and the people they lived among—essential preliminary knowledge for most research in Africa, since Africans are shy of inquirers until they know and trust them. The Alfred Jones Laboratory was an excellent example of the value of continuity, but is now closed down. If nutrition is to be tackled seriously in our tropical possessions this can best be done by men who live there. Its study needs a director and whole-time staff and the same backing as that given to the sleeping-sickness campaign in recent years. Most of the medical advisers at home and the directors of medical services in the colonies have had a greater interest in medicine and hygiene than nutrition; there have been few Sir Thomas Stantons. We need permanent nutritional departments at home and in the colonies, staffed by men who are not only qualified for the work but are vocationally interested in it.

Moreover, colonial nutrition is judged from too narrow an angle. What collateral partnership is there between the study of nutrition and research in agriculture and fisheries, veterinary science, animal and plant nutrition? It is the job of agriculturists to improve the cereal crops which are so badly needed in Africa, to check the growing of uneconomic crops, to prevent soil erosion, and to fight pleuropneumonia and rinderpest in cattle. To the Africans agriculture has always appeared as a child of the political administration and its potentialities have never been recognised. There has been little constructive attempt to create interest in nutrition; few know, for example, that Kew Gardens introduced new foods and the first orchard crops to Africa. In many cases those orchards have been left desolate, or have become local botanical gardens, merely decorative and no longer serving the purpose for which they were intended. Lack of continuity is responsible; Kew is forgotten and unhonoured by the present generation in Africa.

Essential partners in African malnutrition are the venereal diseases. Gonorrhœa is endemic and widespread and is responsible for the bulk of physical unfitness among recruits, for much lost labour and for shortened expectation of life. It is as much a disease of poverty and ignorance as leprosy, but instead of being of Biblical antiquity it has come with the changing world we have created for Africa—with our trade development and with the breakdown of old laws which have been replaced only in part by new ones. Even today we can do relatively little for lepers; but for gonorrhœa we now have specifics and could do much.

Perhaps after the war we shall hear more about the colonial research fund; and perhaps more research facilities will be given to Africans and those whose interest is in the country. Since war broke out we have

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been actively concerned about problems of subnutrition at home. In our colonies, which have been so generous to us, gross malnutrition is rife in peace as well as war.

Parkstone, Dorset. D. FITZGERALD MOORE.

STUDENTS ADVISE THE PRIME MINISTER

SIR,—As signatories of the telegram to which Sir Ernest Graham-Little refers in your issue of Oct. 25, we fully realise that few have the knowledge to advise the Government on problems of pure strategy. But surely everybody has the right to express his opinion on the general policy which he thinks the Government may be pursuing, or which he wishes it to pursue. For the state of public opinion must be a consideration of some weight with the Government in coming to a decision, and the expression of such opinion is a democratic privilege which is not lost once the citizen's vote has been cast.

ISAIAH MORRIS. JUDY WATERLOW.
CYRIL RUBEN.

University College Hospital Medical School.

SIR,—I trust that Sir E. Graham-Little will not lay the flattering unction to his soul that he has disposed, by his letter in THE LANCET of Oct. 25, of the 63 students who sent to him and to the Prime Minister the telegram urging more effective British intervention to help Russia. In the first place his analogy of the surgeon performing an abdominal operation is far from convincing. Unexpected conditions are assumed to be discovered on opening the abdomen which may make the completion of the operation immediately fatal. The surgeon pauses, and the implication is that he is pained and surprised when the onlooking students call upon him, even shout at him, to do something. Why shouldn't they? He gives no explanation to the students of his inactivity. Does he expect them to remain indefinitely mute with acquiescence or admiration at his paralysis, which seems to them to be anything but masterly? After all, a pause from June 22 to the present date seems to be an exceptionally long time under the circumstances. Perhaps also—leaving the analogy aside—some of the students have read Mr. Lloyd George's "War Memoirs" and have developed a healthy scepticism about both politicians and military experts in consequence.

Secondly, Sir Ernest seems to be unaware of the undemocratic tendency implicit in his argument. If we are told to leave every decision to the "unfettered and consummate judgment" of any one person, this simply amounts to dictatorship. On the other hand, criticism and discussion are the essence of democracy and if the authorities keep back important facts they must not be surprised if criticism falls short in certain respects. They will, of course, in these circumstancesal ways be in a position to denounce such criticism as ill-informed—a useful dialectical weapon often used as a defence-mechanism, as shown by the extent to which they tend unnecessarily to hold back information even, in some cases, until after the enemy has published it.

The 63 students are not the only people in this and other countries who are gravely concerned at our apparent failure to take more energetic action to help Russia, as Sir Ernest will know if he happens to read the papers. There may be good, if obscure, reasons for this policy. But I hope they are better reasons than those given in Sir E. Graham-Little's letter.

Harley Street, W.1. FREDERICK DILLON.

EVALUATION OF NUTRITIONAL STATUS

SIR,—At the inaugural meeting of the Nutrition Society more time could perhaps have been profitably spent on discussing measurements of the growth-rate of children as an index of nutrition. In a recent survey I examined 4000 children in different parts of Great Britain for signs of malnutrition, some both before and after dietary additions. As a result I believe that in assessing the state of nutrition in children measurements of the rate of growth are still the most sensitive index. Animal experiments strongly suggest that any dietary deficiency, or combination of deficiencies, will be revealed by a decrease in the rate of growth. Conversely, in human feeding experiments in this country measurements of growth increments are the only observations that have plainly and unequivocally demonstrated the effects on children of an improved diet. In using this nutritional yard-stick frequent measurements of height and weight over as long a period as possible should be taken; single measurements are almost useless. Further, it is essential to compare a child's growth curve with *contemporary* average curves, which should if possible be optimum curves derived from the best fed groups in the population. Alternatively, average height and weight tables from the recent reports of chief school medical officers of the large cities may be used. We know now that the stature of children is not a fixed natural characteristic for a given age but may be altered by varying the environment. For example, since 1920 the average height of 12-year-old Leeds elementary-school boys has increased by 2 in. and their weight by 7 lb.

Assessing the nutritional state of adults is far more difficult. The epiphyses are fused and no longer may cubits be added to our stature. Short of frank deficiency disease we have to rely on a close examination of those tissues which reveal signs of a defective diet most readily—the skin, mucous membranes, eyes and blood. These observations are not easy to make and their significance is sometimes disputed. Perhaps the best index of the state of nutrition in groups of adults, in populations free from frank deficiency disease, would be the changes in incidence of chronic bacterial infection, especially of the respiratory system.

The effect of certain other physiological systems which exert a powerful but subtle influence on nutrition should be borne in mind when assessing nutritional status. Abnormalities in the psychological system, especially anxiety, may prevent the proper utilisation of ingested food. Disorder in the endocrine system—for example, hyperthyroidism—may cause wasteful utilisation of food. Malnutrition may result from bad ventilation or excessive fatigue owing to anoxæmia and lactic-acid accumulation interfering with cell nutrition. Lastly, malnutrition may be due to unsuspected organic disease.

I raise these points in order to re-emphasise the great complexity of assessing the nutritional status and dietary requirements of man. Although the great bulk of malnutrition and deficiency disease can undoubtedly be abolished by improving people's diets, there are certain additional factors which complicate the problem. For practical, as distinct from experimental, purposes, I think it would be of most value to concentrate on watching the growth curves of children and the resistance to infection of adults as the surest indication of trends in the nutritional status of the population.

Royal Hospital, Sheffield. JOHN PEMBERTON.

BLAST INJURY OF THE LUNGS

SIR,—I am sorry that Dr. O'Reilly and Dr. Gloyne have marred their interesting account of blast injury of the lungs (*Lancet*, Oct. 11, p. 423) by such a complete mis-statement of my "views" on the subject. I have never suggested that "blast injury is best marked in the phrenico-costal sinus." Their quotation (*Brit. med. J.* 1941, **1**, 510) should be "Certain parts of the lungs are predisposed to injury. Thus we find subpleural 'rib markings,' injury in the phrenico-costal sinus region, and deep and posterior lesions in the region of the hilus." If they will refer to the *Lancet* of Aug. 16 (p. 198) they will see this in diagrammatic form.

I do not contend that "since they [i.e. blast injuries and contusions or crush injuries of the chest] are so often found together they should be described together," but I do contend that absence of signs of violence to the chest wall means little or nothing. There may have been no usual form of violence to the chest wall or a lorry weighing 6 tons may have passed right over it; I have this conclusively proved with police photographs and post-mortem findings. Conversely the presence of signs of damage to the chest wall does not mean that lung lesions found are not wholly or in part due to blast. I have seen on a number of occasions how, especially in elderly people with rigid chest walls, there may be extensive fractures of ribs but no lung damage. So far no real pathological or clinical distinction has been shown to exist between cases of pulmonary concussion from (*a*) mechanical causes such as road accidents, (*b*) bomb explosions, and (*c*) depth-charge explosions, &c. One outstanding feature is the ease with which the lung lesions can be overlooked, either because they give

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few symptoms or because their symptoms are wrongly ascribed to other lesions present.

The phrenico-costal sinus contusion was stressed because I feel it is proved that this lesion has an abdominal component to the force causing it, it therefore serves to direct attention to the fact that the abdomen is compressed with the chest—Dr. O'Reilly was so much confronted with this aspect that two of his cases had the abdomen opened. I fancy his fig. 2, the radiogram of case 3, shows a phrenico-costal sinus contusion (these radiograms are of such general interest that it is a great pity they were reproduced as positives instead of negatives—they compare very unfavourably with those of Dr. Deaner on the previous page).

The interpretation of the lung changes in any particular case may be so difficult that it is easy to understand them being described as just irregular. This is especially true of cases dying some time after the injury when acute pulmonary œdema may complicate the picture. Some degree of acute pulmonary œdema is the rule in these cases and the more hæmorrhagic forms of this may mimic the deep and often massive hilar contusions (these can be regarded as the contre-coup lung lesion). The action of morphia in preventing the onset of acute pulmonary œdema suggests that Dr. O'Reilly was very wise to use it freely in his cases; the similar action of some anæsthetics indicates that perhaps the dangers of anæsthetics in blast cases has been exaggerated. Since acute pulmonary œdema is benefited by venesection each case should be given careful thought before plasma-transfusion or the like is used.

While I agree with Dr. O'Reilly and Dr. Gloyne that the importance of making a diagnosis of blast injury of the lungs is great I do not believe that it is any greater than making a similar pathological diagnosis in road and other peace-time accidents—cases which are almost regularly treated with complete disregard for the lung lesions.

Derbyshire Royal Infirmary. G. R. OSBORN.

CEREBRAL HÆMORRHAGE IN AN INFANT BORN BY CÆSAREAN SECTION

SIR,—The morbid findings in an infant, which Dr. Lapage (*Lancet*, Aug. 9, p. 160) attributes to some constitutional factor such as deficiency of vitamin K, are of great interest on account of their strong resemblance to what is seen in patients with infective endocarditis who have been treated by a combination of heparin and sulphonamides. This treatment which appears so attractive on theoretical grounds has been associated with fatal cerebral hæmorrhage in a proportion of cases and the brain at autopsy often shows diffuse extravasation involving particularly the white matter of the cerebrum so that large areas are converted into a hæmorrhagic jelly. Elsewhere there are hæmorrhages on a smaller scale and having a distribution similar to that described by Dr. Lapage. The similarity of the pathological findings in the two states is a point in confirmation of the suggestion he puts forward regarding an alteration in the clotting power of the blood.

London, S.W.3. J. H. MULVANY.

FOOD ADVICE FOR THE WAITING OUTPATIENT

SIR,—The part which doctors and nurses play in aiding the national food policy is at present small because nutrition is a matter on which they are seldom consulted by their patients except in cases of illness, and then it is more often the special diet than the general aspect that arises. In spite of the efforts of the Ministry of Food that are everywhere apparent and applauded, enlightenment on the best food to buy within the restricted choice available and the most beneficial methods of cooking it are limited because the ministry lacks the means of reaching the housewife by personal contact. A great opportunity to overcome this difficulty exists in the outpatient departments of hospitals and in the maternity and child welfare clinics throughout the country where hundreds of thousands of women congregate daily. The initiative to exploit this opportunity should come from those responsible for the hospitals and clinics.

At Soho Hospital for Women we are attempting to give advice on food and cooking to a minute fraction of this large group of the population. We have been enabled and encouraged to make the experiment by the good offices of Dr. B. S. Platt of the staff of the Medical Research Council and by the coöperation of the London County Council who have been so good as to give us the services of one of their expert advisers on domestic economy and cooking. This lady comes to the outpatient department once a week, and having made a typical housewife's daily food purchases on the way demonstrates their uses and abuses. This is not done in a formal lecture, which would prolong the outpatients' wait and discourage them, but in talks to a few patients at a time before or after they have been seen by me.

The demonstrations are proving popular and the patients and their friends have expressed their gratitude for the service. The secretary of the hospital will be very pleased to show the scheme in working to anyone who is interested and will communicate with him.

London, W.1. W. C. W. NIXON.

MEDICAL ASPECTS OF BOXING

SIR,—Supposing that boxing has all the disadvantages claimed by Dr. Jokl, which I would not admit, the advantages obtained by it far outweigh them, especially for men in the fighting forces. These are courage, pugnacity, endurance, activity, quick wittedness, and general physical fitness. Far more numerous and serious injuries are incurred in football. I think Dr. Jokl must have the anti-blood-sports mentality. Of all the blood-sports boxing is certainly the bloodiest.

Kimberworth, nr. Rotherham. G. E. MOULD.

ENURESIS

SIR,—In your issue of Oct. 18 Dr. Greene gives us a somewhat turbid criticism of Mr. Winsbury-White's valuable article on Enuresis. This criticism cannot merit any serious reply if for no other reason than that he uses this quite senseless expression: "It would be interesting to know how he *differentiates* these *apparently opposite* groups" in relation to two quite well-known and distinct classes of upper urinary tract dilatation which are clearly and reasonably explained in the author's text. Further, he makes the dogmatic statement that Bartholin's glands do not open into the urethra. I should be glad if he would produce for me any material evidence he has in his possession which proves this assertion.

Guildford. DONALD MACLEOD.

RADIOLOGY AS A CAREER

SIR,—I should like to endorse the remarks of "D.M.R.E." That there is no shortage of radiologists is surely borne out by the fact that only about three advertisements for one have appeared since the beginning of the war, three offering a living wage at any rate. It is pretty generally admitted that the future of radiology will be in the hands of full-time men in the hospitals. Apparatus and running costs are so expensive that proper examinations will soon be prohibitive in private. Yet there cannot be a dozen such appointments in Great Britain.

The difficulties of radiology as a junior specialty, mentioned by your correspondent, are due mainly to the general staffs of hospitals who still think they know all about it and teach their students that all radiologists are bad. They insist on having their work done as and when they wish, giving no chance of organisation to departments whose work is doubled and apparatus halved, and whose coat of arms should be Æsop's man and son and donkey. Hospitals will have to face the facts and put in men at worth-while salaries and let them be masters in their own houses. Otherwise there will be a shortage of good men, who will not take the present pay and status of technicians. The scheme of subsidising half-trained men is typical of the present attitude and will ruin radiology for a generation.

D.M.R.

HYDATIDS IN BRITAIN.—In referring to Dr. Nicolson's paper of June 21 on a pelvic hydatid cyst and the annotation on peritoneal hydatids in the same issue Sir Louis Barnett writes from Hampden, New Zealand: Hydatid disease is not so rare in Britain as many people think. My personal investigations showed that practically all the large hospitals record a case or two every year, and the Registrar-General's mortality returns are not insignificant.

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Obituary

H. E. G. BOYLE

O.B.E., F.R.C.S., D.A.

Henry Edmund Gaskin Boyle was born in Barbados and was educated at Harrison College there before coming to England where he qualified from St. Bartholomew's Hospital in 1901. While a student he was president of the Abernethian Society and after qualification he held the post of casualty officer at the Bristol Royal Infirmary. He then returned to Bart's as junior resident anæsthetist, rising in due course to be head of the department. When he began his life's work the "rag and bottle" methods were universal, but about 1912 the work of Hewitt in this country and Boothby and Cotton in America put gas-and-oxygen on the map and Boyle was quick to grasp its possibilities. In the last war he was instrumental in getting the army authorities to realise the importance of the new anæsthesia in shocked patients and the dispatch of his portable apparatus to casualty clearing stations in France undoubtedly saved many lives. For these services he was made O.B.E. Boyle made a visit to the United States to see for himself the progress of anæsthetic technique. While there he was struck by the value of the Davis gag for dissection tonsillectomy, and on his return he introduced it to British ear, nose and throat surgeons. He was also one of the pioneers of intratracheal anæsthesia. In 1935 the Royal College of Surgeons elected him a fellow and in the same year he received the new diploma in anæsthetics. He was one of the first pair of examiners for this diploma and his fairness and acceptability were widely acknowledged.

For over 40 years "Cockie" Boyle could be seen nearly every day at Bart's and the number of students who benefited by his practical teaching was enormous. He also held anæsthetic appointments at Paddington Green Children's Hospital and St. Andrew's Hospital, Dollis Hill, and had a large private practice. He was not a ready writer, but he contributed now and then to the medical papers and published with his colleague Mr. C. Langton Hewer "Practical Anæsthetics" which reached a third edition.

Boyle was by nature extremely kind and he had hosts of friends. "To an anæsthetist who met him only outside hospital, the characteristics which most impressed me in him," J. B. writes, "were his joviality, a slightly sardonic sense of humour, readiness to speak at a meeting, and general level-headedness. Boyle's earliness in the field with an efficient and not too complicated gas-and-oxygen machine, in the days when that form of anæsthesia was rapidly being established after the last war, has earned for him a lasting name among the anæsthetists." He took a deep interest in student activities, and was a familiar figure in the stand at Richmond for the rugger cup ties. His own sport was cricket and he often displayed his skill in the matches between past and present Bart's men.

In 1910 he married Mildred Ethel, daughter of J. W. Wildy and widow of Mr. Leslie Green, F.R.I.B.A. His health had been failing for some years and he died on Oct. 15, aged 66.

DAVID ORR

M.D. EDIN.

THE sudden death of Dr. David Orr on Oct. 8 at his home in Edinburgh came as a shock to his friends, for he had just returned from a holiday and seemed to be in good health. David Orr was born in 1872 and educated in Edinburgh at George Watson's College. He qualified in 1894 from the university, and in 1902 was specially commended for his M.D. thesis. After qualifying he studied diseases of the eye in London at Moorfields Hospital, and for a time was clinical assistant in the ophthalmic wards of the Edinburgh Royal Infirmary. From postgraduate studies at Heidelberg and Vienna he returned to Scotland to work with Clouston at Morningside, then at Melrose Asylum, and later he held the post of assistant pathologist to the laboratory of the Scottish asylums. In 1898 he was appointed assistant medical officer and pathologist to the Prestwich Asylum, Manchester, and was promoted deputy superintendent in 1911 and medical superintendent in 1924. Unfortunately his health broke down the following year, and he retired to Edinburgh, where he resumed his research in the laboratory of the Royal College of Physicians.

Orr was an indefatigable worker, and during his time as pathologist at Prestwich he published important papers dealing with the pathology of acute insanity, the influence of toxins on the central nervous system, and the paths of infection through the lymph-stream in the spinal cord. He was familiar with the German, French and Italian literature of his subject, and visited the continental clinics and laboratories. In 1909 with R. G. Rows he published a translation of Lugaro's "Modern Problems in Psychiatry." No-one who worked with him will forget his vivid personality and buoyant enthusiasm. He carried with him "the infection of a good courage" and so could "meet all life's ills and accidents with gallant and high-hearted happiness." His main interests outside his work were golf and music. He sang well and had a fund of good stories, and an evening in his hospitable home was something to be remembered.

He leaves a widow and two daughters.

HASTINGS GILFORD

F.R.C.S.

Mr. Hastings Gilford died at the age of 80 on Sept. 6 in Reading where he had set up in practice in 1887 soon after qualifying from Guy's. He continued to practise as a general practitioner to the end of his life and many families recognised his skill as an accoucheur and his devotion to children. But his consulting practice, both medical and surgical, was also growing—he had taken his fellowship in 1889—and in due course he became surgeon to the Reading Dispensary and during the last war to the Sutherland Hospital for Pensioners. With his seeking mind it was inevitable that he should gravitate to the Reading Pathological Society and he read many papers at their meetings. Though most of his contributions were surgical he was a pioneer in the study of the ductless glands and his classic paper on progeria was published in our columns (1914, 1, 672). These investigations led him to the study of cancer, and most of his later writings were a challenge to experimental research, for he contended that cancer was not caused by an outside agency acting on the cells but by a disorder of the cells themselves stimulated by civilised man's unnatural ways of living. In "Postnatal Growth and Development," published in 1911, he put forward the thesis that development begins with the integration of the cell, which continues with increasing complexity and diminishing impetus up to middle age, then merging into declining phases in which this process is reversed. His Hunterian lectures in 1913 dealt with the nature of old age and cancer from this standpoint. He continued his studies of the biological and clinical aspects of the subject and "Tumours and Cancer" appeared in 1925, and he also contributed forceful letters to our columns. Later under the name of John Cope he set out his views for a wider circle of readers. With this bias towards distrust of the conventional Hastings Gilford combined a disarming humility and a receptiveness to the lessons of experience that made him good company for young and old. He took much from the town of his adoption and gave more in return.

Gilbert Adams, Reading

Mr. G. STAFFORD ALLEN, who died suddenly in London on Oct. 22, aged 70, was partner in Stafford Allen and Smith Ltd. of Long Melford, Suffolk, medicinal herb growers. Interest in herbs and gardens was traditional in the Quaker family to which he belonged and he was equally at home in fruit-growing, agriculture and pedigree pig breeding, while his hobby was the rock garden. He was a trustee and manager of the Ogilvie school of recovery at Clacton.

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Medical News

University of Oxford

On Oct. 16 the degree of D.M. was conferred in absence on Eric Smith.

The Rockefeller Foundation is making a grant of £1000 to the university towards the cost during 1942 of research on the growth of and regeneration of nerves to be undertaken by Mr. J. Z. Young in the department of zoology and comparative anatomy.

University of Glasgow

On Oct. 18 the following degrees were conferred :—

M.D.—* H. C. McLaren (with commendation) and C. H. Wilkie.

* In absentia.

M.B., Ch.B.—J. S. Frew (with honours); T. A. Berry, N. C. Scott, John Gilchrist, W. A. Maclure, Wallace Barr, A. W. McLeod, W. B. Newton, Agnes D. D. Murray, and John Renwick (with commendation); F. O. Adewole, A. B. Aiton, W. A. M. Akiyemi, J. M. Alexander, W. H. N. Angus, Robert Auld, A. C. Barry, S. G. A. Bartlett, C. K. Boal, Andrew Bowman, R. D. C. Brackenridge, O. M. Brewster, C. H. Brown, Johanna J. S. Brunton, Walter Burnett, W. F. Caldwell, Janet A. Christie, Thomas Cochrane, H. B. Cowan, G. M. Cubie, J. T. Cunningham, P. N. Cunningham, T. M. Curran, C. C. Cuthbert, Jean W. Cuthbert, J. K. M. Deas, W. A. Dewar, T. M. Donald, W. A. J. Donald, P. A. Duke, R. I. Shaw Dunn, R. L. Ewing, C. S. Farquharson, Hugh Ferguson, James Frame, Marion K. Gilmour, Benjamin Guyer, J. A. V. Hamilton, J. M. Hamilton, A. R. Harbinson, James Hemphill, Ruth L. Henderson, A. T. Hendry, M. J. Hood, Jack Isaacs, Julius Jacobs, Eileen I. Jamieson, J. S. Jeffrey, George Johnston, D. M. Kissen, N. M. Lamont, W. H. Lang, W. R. C. Lang, Innes Lumsden, Mary C. Lynas, Robert McAndrew, W. F. McClemont, A. F. McCoubrey, W. M. MacDermid, Archibald MacDonald, Joseph McGlone, Robert McIlwraith, Mary M. McKelvie, Allan MacKinnon, H. A. Maclachlan, A. G. MacLeod, D. J. MacLeod, J. A. Macleod, N. F. Macleod, J. C. Meek, I. G. Meiklejohn, Edward Millar, Kathleen M. Miller, W. L. Milligan, R. D. Muckart, John Murphy, John Newton, G. W. Park, W. A. Parker, J. B. Pettigrew, R. E. Potts, A. R. Rennie, T. R. A. Richmond, David Robertson, Nathan Sher, D. W. Short, A. M. Smeaton, A. B. C. Smith, J. F. Smith, F. M. Steel, Janet I. Stewart, Sylvia J. Strachan, Thomas Symington, A. C. Tait, G. R. Thomson, J. M. Urquhart, A. R. G. Watson, J. C. Wood, F. W. C. Yardumian, W. H. Yellowlees, Maida B. Young, M. J. Young and Violet B. Young.

Scottish Conjoint Board

At recent examinations of the board of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow the following were successful :—

L.R.C.P. & S.E., L.R.F.P. & S.

C. E. V. P. Amerasinghe, Benjamin Beck, G. C. Cope, T. V. Darke, Thomas Dean, A. M. A. El Far, Yousif Faraony, Ralph Friedman, A. R. Gemmell, M. F. El Giziri, D. F. P. Gordon, David Granet, Benjamin Greenberg, J. H. Haldane, Margaret M. Hanretty, Norman Hornstein, Dorothy L. D. Johnston, George Johnstone, H. E. Klein, R. I. Kynaston, Henrietta Lennon, J. K. Lotinga, B. H. Lunine, Herbert Macpherson, O. P. Markandya, H. J. F. Mitchell, E. K. Neidich, Jack O'Hara, Valaydon Poonoosamy, E. H. Reinsberg, C. B. Robinson, Julius Schneiderman, Robert Smith, Theodore Tuller.

The following graduates of recognised foreign universities have also been admitted licentiates :—

Szulin Riterband, M.D. Rome, Else Wolfsohn, M.D. Berlin.

Tuberculosis Association

A meeting of this society will be held at 26, Portland Place, London, W.1, on Saturday, Nov. 8, at 10.30 A.M. During the morning six short papers will be read and in the afternoon there will be a discussion of problem cases and interesting radiograms.

Medical Honour

Dr. Donald Dunn, house-officer at the London Chest Hospital, has been awarded the M.B.E. Dr. Dunn carried patients to safety single-handed when the hospital was bombed.

Royal Society of Medicine

A general meeting of the fellows of this society will be held at 1, Wimpole Street on Tuesday, Nov. 4 at 3.30 P.M. On Nov. 5, at 2.30 P.M. the section of surgery will meet to discuss streptococcal cross-infection in wards. The openers will be Prof. A. A. Miles, Prof. J. Paterson Ross, Dr. M. van den Ende, and Colonel Leonard Colebrook. At 3 P.M. on the same day Prof. A. T. Jurasz will read a paper to the section of history of medicine on the foundation of the Polish medical faculty within the University of Edinburgh. On Nov. 7, at 10.30 A.M., Mr. F. Watkyn-Thomas will deliver his presidential address to the section of otology. He will speak on otitic meningitis. Mr. E. D. D. Davis has chosen as the subject of his presidential address to the section of laryngology the problems of the otolaryngologist in war. He will give it on the same day at 2.15 P.M.; at 2.30 P.M. Dr. A. D. Marston as president of the section of anæsthetics will speak on the centenary of ether as an anæsthetic.

Medical Casualties

Captain E. J. F. Hinde, M.R.C.S., R.A.M.C., has been reported missing at sea during September.

In recent casualty lists the following R.A.M.C. officers were posted as prisoners of war: T/Major J. M. Fosbrooke, F.R.C.S.E., W.S/Captain J. E. S. Carmichael, M.B. Edin., W.S/Captain A. Mikellides, and Lieutenant R. M. Solomon, M.R.C.S.

Cancer Research Studentship

The council of the Royal College of Surgeons will shortly nominate a Prophit student in cancer research. The studentship will not exceed an annual value of £500 with an allowance of £200 for travelling expenses and the appointment in the first instance will be for one year. Applications should reach the secretary of the college, Lincoln's Inn Fields, W.C.2 before Nov. 22.

CORRIGENDUM.—The reference to Gurd, F. B. and McKim, L. H. on page 429 of Oct. 11 should read: *Amer. J. Surg.* 1941, **51**, 584.

Appointments

BAILEY, J. SHACKLETON, M.R.C.S.: examining factory surgeon for Eye, Suffolk.

BRAND, W. G., M.B. Edin.: examining factory surgeon for Adlington, Lancs.

BUTTERWORTH, JOAN, M.B. Lond., D.P.H.: asst. M.O. for Hants.

GRIFFITHS, H. J., M.R.C.S., D.P.H.: temp. asst. M.O.H. for Newport, Mon.

HALBERSTAEDTER, MAX, M.B. Lond., D.M.R.E.: senior asst. radiologist to St. Mary's Hospital, Paddington.

HALLIWELL, E. O., M.R.C.P.: temp. physician to the Hull Royal Infirmary.

HUNT, A. H., D.M. Oxfd, F.R.C.S.: surgical registrar at the Royal Cancer Hospital (Free), London.

KATZ, JAKOB, M.D. Bratislava, D.P.H. Prague: temp. deputy M.O.H. for Accrington.

KLABER, ROBERT, M.B. Lond., F.R.C.P.: consulting dermatologist to the Luton and Dunstable Hospital.

KNOX, EILEEN, M.B. Brist.: asst. M.O.H. for Huddersfield.

LANCHESTER, H. C., M.A. Camb., M.R.C.S.: R.S.O. at Portwey Hospital, Weymouth.

NEWMAN, J. L., M.D. Camb., M.R.C.P., D.P.H.: deputy M.O.H. and deputy school M.O. for Warwickshire.

O'REILLY, E. J., M.B. N.U.I.: temp. asst. M.O.H. for St. Helens.

* RICHARDS, B. T., M.R.C.S., L.D.S., D.P.M.: medical superintendent of the Langho Colony for Epileptics.

ROGERS, KATHARINE, M.R.C.S., M.R.C.O.G.: M.O. (maternity and child welfare) for York.

WYBURN-MASON, R., M.B. Camb., M.R.C.P.: medical registrar at the Royal Cancer Hospital (Free), London.

* Subject to confirmation.

Births, Marriages and Deaths

BIRTHS

DESMOND.—On Oct. 9, in Bermuda, the wife of Surgeon Lieutenant A. M. Desmond, F.R.C.S., R.N.V.R.—a daughter.

DUNKERLEY.—On Oct. 20, at Westerham, Kent, the wife of Dr. Arthur Dunkerley—a daughter.

MATHESON.—On Oct. 20, in London, the wife of Mr. Iain Matheson, F.R.C.S.—a son.

MONRO.—On Oct. 19, in Singapore, the wife of Prof. J. K. Monro, M.Ch.—a daughter.

OLDFIELD.—On Oct. 21, at Harewood, Leeds, the wife of Major Michael Oldfield, F.R.C.S., R.A.M.C.—a daughter.

RICHARDS.—On Oct. 18, the wife of Dr. A. M. Richards, of Banbury Road, Oxford—a daughter.

MARRIAGES

FLETCHER—SEELY.—On Oct. 24, at Winchester, Charles Montague, M.R.C.P., only son of the late Sir Walter Morley Fletcher, to Louisa Seely.

FRASER—BEETHAM.—On Oct. 16, at Bermuda, Peter Kennedy Fraser, M.D., Surgeon Lieut.-Commander, R.N., to Doris Beetham.

HARPER—SPILLER.—On Oct. 18, Curzon Harper, of Barking, to Violet Spiller, M.D., of Streatham.

HART—MEYER.—On Oct. 25, in London, Philip D'Arcy Hart, M.D., to Ruth Meyer.

HEWITT—WOOD.—On Oct. 25, at Watford, Edward John Campbell Hewitt, M.D., R.A.M.C., of Shenley, to Joan Millicent Wood.

DEATHS

ANDREW.—On Oct. 23, at St. Austell, Wilfrid Andrew, L.M.S.S.A.

BENOLY.—On Oct. 22, at New Clipstone, Notts, Nathaniel Benoly, M.D. Würzburg, L.R.C.P., formerly of Bethnal Green Road, London, aged 92.

BRIDGES.—On Oct. 22, in Cheltenham, Arthur Brodie Hamilton Bridges, O.B.E., M.R.C.S., major, R.A.M.C., late of Kilmington, Devon.

REDFERN.—On Oct. 23, at Compton, Winchester, John Joseph Redfern, M.D. Belf., aged 80.

WARD.—On Oct. 23, at Bournemouth, John Alfred Ward, M.D. Durh., aged 77.

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Notes, Comments and Abstracts

HABITUALLY AND FOR GAIN

L. FARRER BROWN, B.SC. (ECON.) LOND.
BARRISTER-AT-LAW

THE innocent looking phrase "habitually and for gain" has made its reappearance in connexion with a proposal that unqualified persons should be prohibited from making nursing their livelihood. The midwifery profession had experience of the phrase from 1910 to 1926. Accounts of that experience appeared at the time in annual reports of the Central Midwives Board and of medical officers of health, but a brief recital may be of interest.

The Midwives Act 1902 (section 1 (2)) provided that from April 1, 1910 (which was about 7 years after the Roll of Midwives had been established), no woman should "habitually and for gain attend women in childbirth otherwise than under the direction of a qualified medical practitioner" unless she was certified as a midwife. Exemption was granted to legally qualified medical practitioners and to "anyone rendering assistance in a case of emergency." Any woman who offended against this provision was liable on conviction before a court of summary jurisdiction to a fine not exceeding £10.

A considerable number of prosecutions were undertaken in different parts of the country and fines of varying amounts were imposed on offenders; but in many cases in which there appeared to be a clear breach of the law the matter was not brought into court or the prosecution was unsuccessful because of the loopholes open to a defendant. For a prosecution to be successful five things had to be proved:

(1) that the defendant was not a certified midwife;
(2) that she had attended habitually;
(3) that she had attended for gain;
(4) that she attended otherwise than under the direction of a doctor; and
(5) that her attendance was not the rendering of assistance in a case of emergency.

Proof of the first was easy, but the remaining four often presented difficulties. Many magistrates required strict proof that attendance had been habitual and for gain. "Habitually" is an elastic term and was a hard thing to prove because evidence was required of attendance under improper conditions in a number of cases and within a recent period. "For gain" is ambiguous. If payment is not demanded but a present is given as a thank-offering is that gain? Even when the payment of money could be proved, evidence that the defendant had rendered other services at the same time, such as washing clothes, cooking, helping in the house, or looking after the other children in the family, tended to weaken the prosecution's case. To prove the payment of money was not without its difficulties. For example, the mother states on oath that she called at the defendant's house and paid the defendant's fee for attending at the confinement, but was not given a receipt. The defendant denies having received any payment and declares that she attended the mother merely as a friend. There is a conflict of statements and in the absence of a witness or a receipt signed by the defendant the charge is likely to be dismissed on the ground that there is no evidence corroborating the mother's statement.

"Covering" by medical practitioners provided some offenders with the means of escaping punishment. At one stage such covering was by no means infrequent, and the Central Midwives Board therefore brought proceedings against certain doctors before the General Medical Council. The first of these cases was in respect of covering in its most open and common form. The doctor had arranged with an uncertified woman to "look after" her cases for her "at the modified fee of 7*s*. 6*d*." It was proved that three women had been delivered by the uncertified woman, that the doctor had called the next day but not subsequently, that he had not examined the patients, and that he had been paid a fee of 7*s*. 6*d*. by the uncertified woman in each case. He had notified the births—a proceeding clearly designed to conceal that the women had been delivered by the uncertified woman alone. The doctor was found guilty by the General Medical Council.

The exemption granted to anyone rendering assistance in an emergency was abused. This abuse seems to have been facilitated by the attitude of some benches of magistrates and by the desire of many patients to screen the uncertified women who had attended them. In one case in the home counties the defendant pleaded guilty, but said that she wished to continue her work as a midwife in the interests of the poor of the neighbourhood. Apparently the sympathies of the women she had attended in their confinements, of the magistrates and of the general public present at the hearing were enlisted on her behalf. The chairman of the bench stated that they were bound to record a conviction but did so with very great regret, that they would reduce all the defendant's expenses and would only impose a fine of 1*s*. which would be paid by one of the members of the bench. The chairman then informed the defendant that in future she could act in the absence of a doctor only when the case was one of emergency, to which she replied "There will be plenty of emergency cases then," and the chairman responded "We know you are doing a good work."

A change in the law was made in 1926. The phrase "habitually and for gain" was dropped, and an attempt was made to prevent abuse of the necessary exemption in a case of emergency by placing on the defendant the onus of proving that attention had been given "in a case of sudden or urgent necessity." The new provision,[1] which is still in force, was in the following terms:

"If any person, being either a male person or a woman not certified under this act, attends a woman in childbirth otherwise than under the direction and personal supervision of a duly qualified medical practitioner, that person shall, unless he or she satisfies the court that the attention was given in a case of sudden or urgent necessity, be liable on summary conviction to a fine not exceeding ten pounds."

Exemption was granted to pupil-midwives and medical students attending confinements as part of their training. It will be noted that a curious omission in the earlier act was remedied. In the 1902 Act the prohibition applied only to unqualified *women*. In 1926 unqualified men-midwives were brought within the scope of the prohibition.

BRITISH COLLOIDS LTD. (Crookes Laboratories) have withdrawn the following lotions and creams from the general market: Lacto-calamine, calamine cream and lotion, zinc cream, and mercury and sulphur scalp lotion. These preparations will in future only be supplied on a doctor's prescription.

Infectious Disease in England and Wales

WEEK ENDED OCT. 18

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1195; whooping-cough, 1979; diphtheria, 1002; paratyphoid, 62; typhoid, 16; measles (excluding rubella), 783; pneumonia (primary or influenzal), 624; puerperal pyrexia, 161; cerebrospinal fever, 107; poliomyelitis, 50; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 143; ophthalmia neonatorum, 86. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 15 was 1295; including scarlet fever, 168; diphtheria, 267; measles, 19; whooping-cough, 530; enteritis, 24; chicken-pox, 17; erysipelas, 25; mumps, 9; poliomyelitis, 6; dysentery, 17; cerebrospinal fever, 14; puerperal sepsis, 14; enteric fevers, 46; german measles, 2; other diseases (non-infectious) 56; not yet diagnosed, 81.

Deaths.—In 126 great towns there was 1 (1) death from enteric fevers, 2 (0) from scarlet fever, 1 (0) from measles, 10 (4) from whooping-cough, 11 (1) from diphtheria, 46 (0) from diarrhœa and enteritis under 2 years, and 12 (0) from influenza. The figures in parentheses are those for London itself.

Sheffield reported 8 deaths from diarrhœa, Birmingham 7, and Manchester 6. In the same week Dublin had 22 fatal cases of diarrhœa and Glasgow 15.

The number of stillbirths notified during the week was 180 (corresponding to a rate of 33 per thousand total births), including 18 in London.

1. Midwives Act 1926, section 1.

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ORIGINAL ARTICLES

RENAL LESIONS IN TWO CASES OF CRUSH SYNDROME

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MARJORIE GILLESPIE, M.D. GLASG.
ASSISTANT PATHOLOGIST TO THE LONDON COUNTY COUNCIL

J. S. F. NIVEN, M.D. GLASG.
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(Pathological Department, University and Western Infirmary, Glasgow, and L.C.C. Group Laboratory, Hampstead)

FROM the accounts of the sequelæ of certain forms of crushing injury recorded by Bywaters and Beall (1941), Beall, Bywaters, Belsey and Miles (1941), Mayon-White and Solandt (1941), and others, it is clear that in such cases acute renal insufficiency is relatively frequent. While this is accompanied by certain pathological changes in the kidneys, the descriptions of the renal pathology so far available do not appear to offer a completely satisfactory explanation of the gross functional disturbances observed during life. Neither do they seem sufficient to provide a clear correlation of this with any previously described form of acute renal lesion. In two cases of this kind which we have recently had the opportunity to examine the changes in the kidneys are of a definite and unusual nature. We hope that our findings may stimulate inquiry as to whether similar appearances can be detected in the kidneys of other fatal cases of crush syndrome.

CASE 1

A woman, aged 18, was admitted as an air-raid casualty to the Hampstead General and N.W. London Hospital, on April 17, 1941, under the care of Mr. Arthur Gray, F.R.C.S. She had been pinned under a beam for six hours. On admission she was in a state of shock with cold extremities, and the blood-pressure was 112/78 mm. Hg. Both legs had been crushed under debris and there was an area of bruising on the left calf with death of a portion of skin, measuring 5 × 5 in. There were also many abrasions of the skin and a fracture of the pelvis was recognised by X rays. Steps were taken to counteract shock and the wounds were cleaned and treated with sulphanilamide powder and flavine; 2000 units of A.T.S. was administered intramuscularly. The patient received also potassium citrate gr. 30 and sulphapyridine 1 g. three times a day. During the following days the pulse continued poor though the blood-pressure had risen. There was restlessness and drowsiness without sleeping and vomiting was frequent. Some of the daily observations are recorded in the table. Œdema appeared in the legs, particularly in the right thigh, on the second day; it increased and became gross on both sides before death. Hiccough developed on the sixth day and acute dilatation of the stomach on the seventh; the dilatation was relieved by lavage. The pulse became variable, with dropped beats, and the patient died on the ninth day.

Observations in case 1

Day	Blood-pressure	Fluid intake	Vomiting	Urinary output	Urine	Urinary urea	Blood-urea	Hæmoglobin
	mm. Hg	c.cm.				mg/100 c.c m.		%
1	..	..	+	420	Blood +	..	..	..
2	..	1530	+	240	Blood +	..	..	..
3	140/90	1080	+	120 +	..	..	..	..
4	145/90	900	+	240 +	Red cells in deposit	..	..	..
5	136/85	510	+	180	Alb. + ; red cells + granular casts + +	..	106	85
6	165/85	3630	1770	240	Alb. + ; red cells + granular casts +	..	..	..
7	158/80	3600	3720	270	Tr. alb. ; no blood	..	200	83
8	165/80	3000	640	420	No blood or alb.	1000	368	..
9	130/68	..	..	..	..	..	..	..

An *autopsy* was performed (M. G.) on April 26, twenty-three hours after death. There were numerous skin abrasions and the injuries previously mentioned were confirmed. A circumscribed area of pale necrosis 6 cm. long was found in the right quadriceps femoris muscle. Œdema was present in both legs and in the chest wall. The heart showed no important change. Petechiæ were present in the pericardium and pleuræ. The pleural cavities each contained 1500 c.cm. of clear fluid; both lungs were grossly œdematous. No important change was seen in other organs apart from the kidneys. These were enlarged (R. 242, L. 230 g.). The capsules were non-adherent and the surfaces smooth. On section fluid oozed from the cut surfaces. The renal cortex was pale and mottled, and in the deep parts there was an opaque whitish zone 2 mm. in breadth surrounding the bases of the medullary pyramids, which were darkly congested.

Histological examination of the kidneys shows that the general arrangement of the cortex is not disturbed by any antecedent chronic change. There is a slight separation of the tubules as by œdema. The glomeruli are normal in size, cellularity and blood content. Spheroidal masses of homogeneous material, somewhat resembling dead cell bodies, occur in many of the capsules of Bowman; these appear to be albuminous aggregates, for the lining cells of the capsules are, in general, in situ and normal. In the *first convoluted tubules* the epithelium is of normal appearance; there is no catarrh or evidence of recent regeneration, while with special stains neither fat nor hyaline droplets are demonstrable. Their lumina, sometimes very slightly dilated, contain amorphous debris or rounded masses like those in the capsules; no hæmorrhages or casts are seen in them. The *second convoluted tubules* are more conspicuous than normally owing to denser nuclear staining. All of them show some pathological change, though the degree of this varies greatly. In the majority the alterations are slight, comprising moderate dilatation of lumina, slight basophilia of cell protoplasm and increase in the number and density of staining of nuclei. These appearances, which correspond to those seen in regenerated tubules after a mild experimental tubular nephritis, are more pronounced in occasional tubules or in small groups of segments where mitoses can be recognised in the cells: around such tubules there is definite plastic overgrowth of the supporting interstitial tissue (fig. 1). In many of these second convoluted tubules there are also light casts of orange-brown material resembling hæmoglobin which takes the form of beaded filaments or amorphous masses. In one or two places in the cortex there are foci of still more severe damage of second convoluted tubules of a type which will be described in the boundary zone where they occur in much larger numbers (fig. 2). *Boundary zone.* It is in this region, where the straight descending limbs of first convoluted tubules in the medullary rays of the cortex are changing to narrow descending limbs of Henle, that the most remarkable histological picture is observed. In any single section the low power reveals large numbers of severe focal lesions affecting the broad ascending limbs of Henle's loops, the segments which lead up to the second convoluted tubules in the cortex (fig. 3). These lesions often occur in groups and each group is surrounded by a very definite recent overgrowth of interstitial tissue. By examination of serial sections it is in most instances easy to ascertain that each focus implicates not only a tubule but also the thin wall of an adjacent venule. The tubule can be traced from comparatively normal conditions above and below to a level where there occurs an aneurysmal bulge of 40–80 μ diameter. This is usually filled by a dense mass of albuminous coagulum which stains faintly with eosin and gives a light fibrin reaction. The epithelium lining the bulge has suffered especially severe damage and the actively regenerating cells are often thinned out and flattened, the relining being sometimes incomplete. This bulging part of the tubule indents the wall of the small venule and often protrudes into the lumen of the latter, while in some instances there is clear evidence that it has actually ruptured through (fig. 4). The inner wall of the venule at a point of rupture is covered by a cap of thrombus continuous with the coagulum in the tubule, and frequently a strand of proliferated epithelium is enclosed in the thrombus. Sometimes a considerable strand of proliferated cells extends in the venous channel, loosely held in thrombus. These proliferating cells in this unusual site can be identified with considerable

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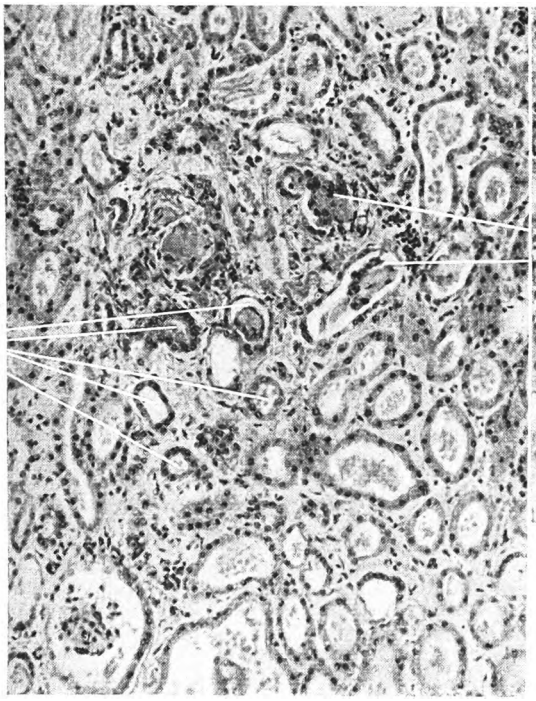

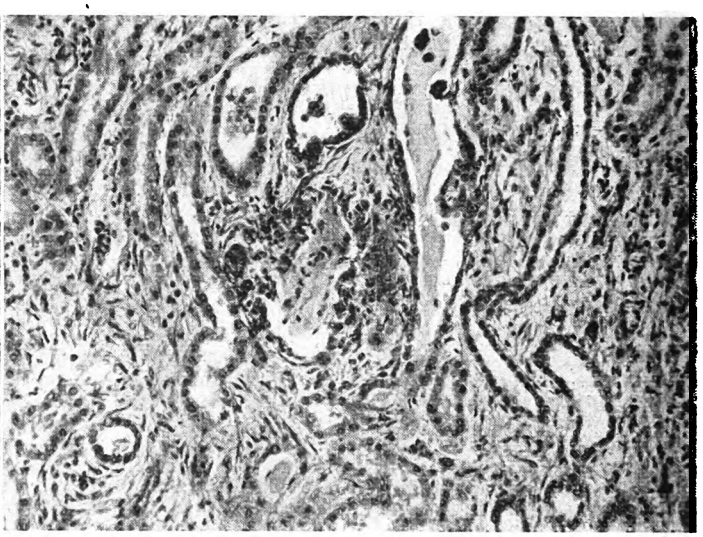

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FIG. 1—Moderate lesions of second convoluted tubules in cortex (indicated by white lines); proliferation of epithelium with new cells cast off in some lumina. First convoluted tubules all around are normal apart from debris in lumina. × 150.

FIG. 3—Ascending limbs of Henle in boundary zone. One intense lesion in centre with dilatation of lumen and active regeneration of epithelium; tubules nearby less affected; normal tubules on left above. × 150.

certainty as epithelial; the endothelium of the vessel is unaltered except where it has been completely destroyed under the cap of thrombus. In many of the smaller foci of this type the albuminous mass protrudes through a gap in the dilated wall of the tubule into the connective tissue outside, and it is not clearly ascertainable that it has entered a venule, though the appearances leave it possible that a very small vessel has been involved. The number of these foci of intense tubular damage is in this case very large, so that in a single low-power field it may be possible to identify three to five involving the wall of one of the larger venules of 200 μ diameter (fig. 5).

Medulla. Most of the collecting tubules are normal but in a number of them there are orange-brown casts of varying size. These are mostly light and are composed of beaded ribbons of material resembling hæmoglobin. A few are more solid and are large enough to press on the epithelial lining, which is then flattened and may show some regenerative change. The evidence of damage of cells is, however, comparatively slight in any of the collecting tubules.

CASE 2

A man, aged 51, admitted to hospital on April 17, 1941, was an air-raid casualty who had been buried under debris for 8 hours. He had crushing injuries of the legs with fracture of the right internal malleolus and laceration of muscles in the right foot. The clinical course was characterised by oliguria and hæmaturia, and the blood-urea rose from 100 mg. per 100 c.cm. on April 21 to 384 mg. on the 24th and 400 mg. before his death on the 25th. On the 24th the urinary urea was 1·3 g. per 100 c.cm. and chlorides 1·5 g. as NaCl per litre. The illness was similar to that in case 1.

Autopsy.—There was no obvious œdema of subcutaneous tissues. The heart showed slight dilatation of the right ventricle. Both lungs had areas of consolidation in the lower lobes with suppurative softening and there was pleurisy on both sides. The kidneys (R. 180, L. 210 g.) were large and of firm fleshy consistence, not fibrous. The surfaces were slightly granular and there were a few small areas of indentation of irregular shape. On section the cortex was of normal width and aspect, apart from some congestion. The pyramids were congested.

Histological examination.—There are in the renal cortex a considerable number of ill-defined areas of partial atrophy of tubules with sclerosis of a few glomeruli, and around these there is some interstitial thickening with lymphocytic infiltration. In the medulla also some vertical bands of moderate fibrosis occur. These changes, which may have been pyelonephritic in origin, are clearly of old standing and in keeping with this there is some diffuse intimal thickening in arteries and arterioles. There remain, however, considerable areas of cortex which have been practically normal, and in these parts there can be recognised lesions of recent date similar to those described in case 1. These lesions comprise the following: (*a*) Light brown casts resembling hæmoglobin in second convoluted tubules. (*b*) Proliferation of cells in some of these tubules. (*c*) The more intense focal lesions with rupture of tubules and extrusion of albuminous material. The majority of these are of small size and cannot be seen to enter venules; most of them occur in the boundary zone. A few of them, however, are larger and implicate the walls of venules as in case 1. The walls of the venules are thicker in this case and may have been less easily perforated. The lesions here appear to be slightly older and more nearly healed than in case 1. (*d*) In the medulla large orange-brown casts occur in many collecting tubules and their presence is associated with some appearance of damage and regeneration of epithelium. The casts are more numerous than in case 1.

DISCUSSION

In the records of fatal cases of crush syndrome the brown casts in the renal tubules have been a conspicuous feature, and similar casts have been described in the urine of cases which recovered (Longland and Murray 1941). The question has been raised whether blockage of tubules by these casts could be the cause of the renal disability, but histological evidence on this point is inconclusive. The persistence of casts in the tubules could so easily depend on diminution of filtrate, whether this resulted from an impaired circulation or from some other cause. The most important criticism of the blockage theory, however, has been made by Bywaters and Beall, who point out that if tubular obstruction alone were concerned such urine as was secreted should theoretically be of normal composition, coming from unobstructed tubules; but in their experience the urine was little more than a glomerular filtrate (urea-concentration factor 1·6–2·8 in their cases 1 and 2), and this is confirmed by figures taken from Henderson's (1941) chart of a recovered case (concentration factor about 3·3 on the tenth day when the urinary output was about 700 c.cm.). In our cases 1 and 2 also single observations on the eighth day gave concentration factors of only 2·7 and 3·3 respectively. Such extreme degrees of ablation of one of the highest functions of the kidney are of considerable moment and it is no doubt significant that among acute renal conditions the greatest reduction of concentrating power is known to occur when there is severe damage of tubular epithelium. This may be observed in mercurial

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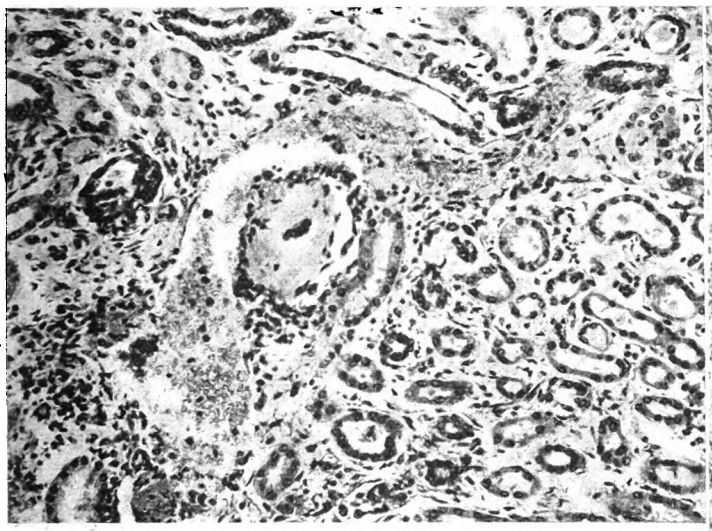

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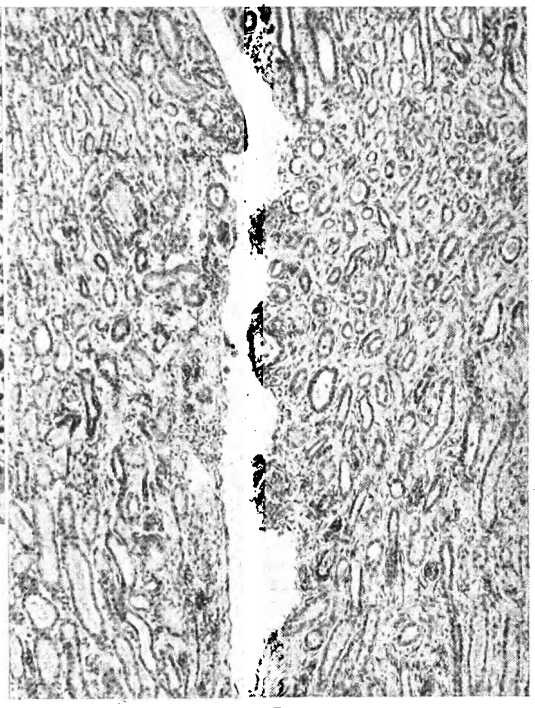

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FIG. 4—Tubulo-venous lesion in boundary zone. Dilated tubule filled with coagulum bulging into venule into which rupture had occurred. × 150.
FIG. 5—Three tubulo-venous lesions in which ruptures have occurred. × 65.

nephritis in man and has been a characteristic finding in experimental tubular nephritis in animals (Dunn, Howarth and Jones 1924).

The most comprehensive descriptions of tubular epithelial changes so far available are by Bywaters and Beall, who mention severe damage in the form of fraying of protoplasm and vacuolation, but also regenerative changes with mitotic division and proliferation. These are referred to ascending limbs of Henle and to convoluted tubules generally. Mayon-White and Solandt have noted degenerative changes of acute character with pyknosis of nuclei, but mention no special localisation. Minami (1923) who, as has been pointed out by Bywaters (1941), gave an account of the renal lesions in cases of similar character, also described only acute changes in convoluted tubules without specific localisation. In our own cases the definite epithelial alterations appear to be restricted to ascending limbs of Henle and to second convoluted tubules, and are at a proliferative and healing stage, as might be expected in tubular lesions of over a week's duration. The identification of the two sets of convoluted tubules in a previously normal kidney is not difficult. Apart from having a wider diameter and taller epithelium, each first tubule forms a compact mass of closely packed convolutions into which no other tubule enters. The second, with narrower calibre, lower epithelium and closer set nuclei, is much shorter and pursues an open angled course between the above masses; it therefore appears in sections only as isolated rings or ovals or in small rather loose groups. The ascending limbs of Henle which lead to the second tubules are, it may be noted, somewhat similar to these in histological appearance. While the anatomical structure and arrangement of the nephrons are now fairly fully established, much as yet to be learned about the functioning of the different parts, but there is increasing evidence that it is in the lower segments that final adjustment of reaction occurs, in man and carnivora as a rule to the acid side.

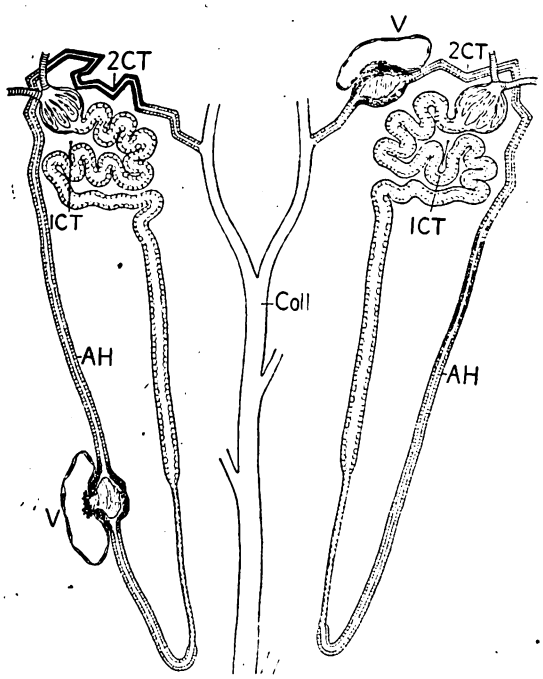

FIG. 2—Arrangement of nephrons, showing sites of lesions. I.C.T., 2.C.T. = first and second convoluted tubules. A.H. = ascending limbs of Henle's loops. Coll. = collecting tubules. V. = venules with severe tubulo-venous lesions.

It is difficult to find in the diseases of man any analogy for a condition of acute selective damage of the lower segments of the nephron, but evidence drawn from experimental lesions in animals may assist in elucidating the pathogenesis of a lesion of this kind. Dunn and Polson (1926) have shown that by the introduction into the circulation of the rabbit of large doses of uric acid in solution, in the form of lithium monourate, severe selective damage can be produced in the ascending limbs of Henle, second tubules and to some extent collecting tubules, while the first convoluted tubules remain normal in appearance. Necrosis of the epithelial linings is produced within an hour or so of the injection, and regenerative changes are in full swing by the fourth to eighth day. In the regenerative phase the lesions show distinct similarity to those in the present cases, except that tubulo-venous lesions are not found. In these animals, just as in uranium or oxalate nephritis where the first convoluted tubules are selectively damaged, there is anuria or oliguria with low urea concentration, and the blood-urea rises. These phenomena have been attributed by Dunn and Polson to non-selective reabsorption of filtrate through the damaged walls of tubules into the blood, thus escaping excretion. More recently McFarlane (1941) has shown that in the experimental phosphate nephritis of rats, which was described by Mackay and Oliver (1935) and by Duguid (1936), the

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lesion is again almost restricted to the lower nephron segments, and he agrees with Dunn and Polson in attributing the special localisation of lesions at this level to change of reaction in the filtrate, added no doubt to increase of concentration which has been effected at higher levels.

A feature which appears to be unique among the tubular changes in the present cases is the localisation of the most intense damage at points where the lower nephron segments lie in close proximity to veins. Further confirmation of this occurrence in other cases would be desirable but in our material the frequency of the association is so remarkable as to suggest a definite causal nexus. In uric-acid nephritis there seems to be little doubt that the lesion is determined by precipitation of the agent from a soluble form in which it is relatively harmless to a solid which exerts the destructive effect. It seems possible that in the present cases also a substance of special toxicity is produced in the presence of acid, and that the proximity of venous blood has an influence in permitting a greater swing towards an acid reaction in this area than is reached at other parts.

Nothing certain is known as yet of the nature or source of any toxic agent which may be responsible for the renal damage in cases of crush syndrome. The available facts, however, appear to justify the primary view to which most observers have adhered—that after release of the affected tissue from a compressed and more or less ischæmic state something toxic is absorbed from it into the circulation as the vessels reopen, and that the toxic agent affects the kidney in the course of excretion. The number and kinds of possible toxic agents which could so arise is conjectural and the suggestion that the cast material, which apparently contains myohæmoglobin (Bywaters and Delory 1941), is toxic is not to be ignored. Some light will probably be thrown on the genesis of this condition by experimentation with products obtained from muscle or other tissues. While not attempting to prejudge the results of this investigation, we suggest that both uric acid and phosphoric acid may well come under review as possible toxic agents, seeing that both of these molecules have a well-recognised origin in muscular tissue in the form of inosinic acid.

The part, if any, which may be played in the initiation of this syndrome by lowered blood-pressure consequent on shock has yet to be determined. Bywaters and Beall, while recognising that oliguria may be contributed to by a fall of systemic pressure and also by dehydration, could not attribute primary significance to either of these factors in their cases. There appears also to be general agreement that the degree and kind of renal functional disturbance which develops after crushing of the limbs is quite distinct from any of the sequelæ of ordinary surgical shock, and the exact pathology of the renal lesion itself is required in order to throw some light on this special feature. Maitland (1941) has suggested that the renal failure may be caused by vascular stasis in the kidneys resulting from low blood-pressure and aggravated by hæmoconcentration, while the circulation is flooded by abnormal protein from damaged muscles. It would be impossible at present to deny significance to any of these factors acting separately, but it does not seem a good argument that they would act concurrently in the early hours when injury appears to be inflicted on the kidneys; an accumulation of abnormal products in the blood would imply a fair circulation even through the injured limb, and an important lesion confined to the kidneys would suggest that they had received an adequate dose of the toxic agent from blood which passed through them. The significance of selective involvement of the kidneys in the present cases can hardly be overlooked, and it may be set in contrast to the lack of evidence for damage of other organs—the liver, for example, appears to function normally, for urea formation proceeds unchecked and large amounts accumulate in the blood. In considering possible reasons for specific localisation of damage in the kidneys attention may be drawn to a fundamental observation in experimental nephritis—that renal tubular damage can be most surely produced when the renal blood-flow is normally abundant and the concentrating power of the organs is unimpaired; for these reasons they sustain a more intensive attack by the toxic agents than do other tissues.

SUMMARY

The most definite changes found in the kidneys from two cases of crush syndrome are restricted to the ascending limbs of Henle's loop and second convoluted tubules; the lesions are in a healing stage.

The most severe of the tubular lesions implicate the walls of small venules, into which many of them have perforated.

The special localisation of these lesions may depend on change of reaction in the tubular contents at these levels.

Uric acid and phosphoric acid are substances capable of producing selective damage in these tubular segments.

We are indebted to Mr. Arthur Gray for permission to abstract the clinical notes of the cases and to Dr. Robert Cruickshank for his assistance in procuring the pathological materials. Reproductions of photographs by Mr. John Kirkpatrick.

REFERENCES

Beall, D., Bywaters, E. G. L., Belsey, R. H. R. and Miles, J. A. R. (1941) *Brit. med. J.* **1**, 432.
Bywaters (1941) *Ibid*, **2**, 29.
— and Delory, G. E. (1941) *Lancet*, **1**, 648.
— and Beall (1941) *Brit. med. J.* **1**, 427.
Duguid, J. B. (1936) *J. Path. Bact.* **43**, 321.
Dunn, J. S., Haworth, A. and Jones, N. (1924) *Ibid*, **27**, 377.
— and Polson, C. J. (1926) *Ibid*, **29**, 337.
Henderson, R. G. (1941) *Brit. med. J.* **2**, 197.
Longland, C. J. and Murray, J. (1941) *Lancet*, **2**, 158.
McFarlane, D. (1941) *J. Path. Bact.* **52**, 17.
Mackay, E. M. and Oliver, J. (1935) *J. exp. Med.* **61**, 319.
Maitland, A. I. L. (1941) *Lancet*, **2**, 446.
Mayon-White, R. and Solandt, O. M. (1941) *Brit. med. J.* **1**, 434.
Minami, S. (1923) *Virchows Arch.* **245**, 247.

T.N.T. JAUNDICE

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THIS is an account of observations on seven patients employed in an ordnance filling factory and suffering from toxic jaundice, apparently caused by trinitrotoluene. The condition is not uncommon under the present war conditions, and early diagnosis and treatment are essential. All our cases have occurred within 6 months of beginning employment at the ordnance factory, and in one fatal case the patient had been in contact with explosives for only 3 weeks when symptoms appeared. Six out of seven cases were in women, three of whom were unmarried; there was no history of pregnancy toxæmia in any patient. Two of the patients died.

SYMPTOMATOLOGY

Nausea or vomiting was the first symptom noticed in five patients; in the remaining two jaundice and cyanosis were the first symptoms. After an interval lasting up to 12 days jaundice was noticed. A constant early symptom was vague epigastric pain or discomfort and anorexia which preceded the appearance of jaundice by several days.

Jaundice appeared in all the patients within 12 days of the onset of symptoms. The colour in the early stages was the lemon yellow of toxic jaundice, to be distinguished from the more greenish yellow of obstructive jaundice. This colour is like that of a one in a thousand aqueous solution of acriflavine, and is really lemon yellow with a trace of orange; it is readily distinguished by clinical students from the colour of obstructive jaundice patients, but may be confused with that of catarrhal jaundice. Difficulty may arise because many of the healthy workers show some orange tinting of the hair and exposed skin from the local action of the explosives. In three of the patients the jaundice increased after admission and became rather darker. A tendency to bruising was noticeable in all the patients whose jaundice was well marked, and petechial hæmorrhages were a prominent feature of both the fatal cases. Cyanosis and anæmia were only observed in two of the patients, and it must be noted that cyanosis is very common in these workers and is not necessarily related in any way to jaundice. The liver was not grossly enlarged in any case, and was only palpable in one patient who subsequently developed signs of cirrhosis.

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The temperature remained subnormal except in the terminal phase of the two fatal cases. There were no rigors, and no patient complained of chills. The pulse-rate was variable, but was usually about 80 per min. in most patients. The absence of fever and rigors is one of the main differential points between this condition and catarrhal jaundice.

The urine contained bile-pigments in all cases, and there was albuminuria at some period in four patients. Webster's test [1] demonstrated the excretion of trinitrotoluene in the urine, but was not constantly positive in all patients, only becoming so during treatment in some cases. Many of the workers in trinitrotoluene give a positive Webster test; this indicates not intoxication but only excretion of the substance. Leucine and tyrosine crystals were not demonstrated in the urine of any patients.

The blood in all cases gave a positive direct and indirect van den Bergh reaction. No constant changes could be demonstrated spectroscopically, because owing to enemy action adequate facilities were not available. Anæmia was only severe in one patient who developed aplastic anæmia after the jaundice had resolved. The white-cell count showed a leucocytosis of up to 15,000, with relative polymorphonuclear increase in several patients (this has been observed in some apparently normal workers).

The lævulose-tolerance test was performed as a routine during convalescence, but showed no abnormality in any of the cases which reached this stage.

No evidence of the presence or formation of gall-stones was found at any stage.

AUTOPSY FINDINGS

Two patients have died, one from acute liver atrophy 16 days after the appearance of jaundice, the other from aplastic anæmia 18 weeks after the onset of jaundice and 9 weeks after its disappearance.

The findings in the first case were those of acute yellow atrophy of the liver. There was extensive jaundice, with many ecchymoses and petechial hæmorrhages on all serous membranes. The liver was grossly shrunken, soft and bile-stained, and weighed only 21 oz.; the appearances were those of the necrotic stage of acute yellow atrophy. The spleen showed some softening but was otherwise normal. The bone-marrow was red in the whole length of the right femur. The kidneys showed poor differentiation of medulla from cortex (possibly partly post-mortem change). Other organs showed no gross abnormality apart from bile-staining. Sections showed gross necrosis and disorganisation of the liver lobules, with some infiltration with round cells, and much amorphous debris, presumably from broken-down liver cells. The bile-ducts were not much affected, and did not show any inflammatory or hyperplastic changes.

The second fatal case was of special interest, for the jaundice had resolved completely 9 weeks before the patient died of aplastic anæmia, of which there was no sign while the jaundice was present. The post-mortem appearances were as follows. Pallor of the skin and some ecchymoses. The fauces and soft palate were ulcerated. The liver was finely granular and somewhat shrunken. The cut surface of the liver showed some pale areas of degenerating liver tissue, and pink areas of developing fibrosis. It weighed 40 oz. The spleen and kidneys showed no gross abnormality. The marrow of two ribs, the sternum, lumbar vertebræ and upper halves of both femurs was reddish, but not as red as typical hyperplastic marrow. Other organs showed no gross abnormality. Sections showed subacute necrosis of the liver, with some fatty degeneration, hypertrophy and fibrosis. Marrow smears showed no evidence of myelocytes or nucleated red cells.

CLINICAL COURSE AND TREATMENT

The patients must be removed from contact with trinitrotoluene as soon as the condition is suspected, and put at rest. On admission to hospital all the patients except one were given 20 g. of glucose daily in drinks, and 15 units of insulin per day; in this one case the jaundice persisted for 2 months—about a fortnight longer than the average period for the others. Vitamin C, 100 mg., was given daily by mouth. A light diet was given, and symptomatic treatment ordered as required. It should be remembered that many drugs—e.g., sulphonamides, chloral hydrate and amidopyrine—may cause damage to the liver or bone-marrow, and so are to be avoided in T.N.T. poisoning. The jaundice in several cases increased after admission to hospital, but began to fade after 1–2 weeks, and in four cases was gone within 6 weeks; one other resolved after 8 weeks, and a second resolved slowly about 3 months after the onset.

The true end-results of the condition in these patients cannot yet be estimated, for it is only 6 months since the first patient became jaundiced. The present condition of all the patients may be summarised thus:

One patient has died of acute yellow atrophy (case 1).

One patient developed agranulocytic angina with the blood-picture of aplastic anæmia, and in spite of all treatment died 14 days after readmission (case 2).

One patient has ascites, apparently from cirrhosis, but is now free from jaundice, and the effusion has to be tapped only at increasing intervals (case 3).

Four patients have apparently recovered and are free from all symptoms.

The final result of the four apparent recoveries and the patient with cirrhosis can only be judged when further time has elasped and liver-function tests have been carried out. The findings in the liver of the second fatal case seem to indicate that a good deal of regeneration of liver tissue can take place, and probably has taken place in the apparent recoveries.

CASE-RECORDS

CASE 1.—Unmarried woman, aged 21, started work at ordnance factory in March, 1941. On July 9 she was admitted to hospital complaining of jaundice, noticed for about 4 weeks; on July 5 she had felt pain in the epigastrium, and had vomited next day. The bowels were regular, but pale stools were noticed about July 5. On admission there was a fairly well-marked yellow jaundice, with clean moist tongue, and normal temperature and pulse-rate; the urine contained bile-pigments, but no other abnormal constituent. Van den Bergh reaction, positive direct and indirect. Webster test on the urine became positive on July 14 and a faint trace of albumin appeared in the urine on July 17. The blood-picture was normal. On the 19th the jaundice was deeper, and the patient was rather dazed, with poor pulse and persistent vomiting. Intravenous glucose saline drip was instituted, but her condition deteriorated. On the 21st petechiæ and ecchymoses appeared, and the liver dullness was decreased. The patient died on July 23 with high terminal pyrexia.

CASE 2.—Unmarried woman, aged 35, started work with T.N.T. on March 10. On the 31st she noticed nausea, succeeded a day or two later by vomiting; epigastric discomfort and jaundice appeared on April 6. She was admitted to hospital on April 12. There was well-marked jaundice, with bile-pigments in the urine and pale stools. Constipation was not noted. The temperature and pulse were normal, and no other abnormalities were found. At this time blood examination revealed 5% reticulocytes and no anæmia. The jaundice became extremely deep about May 5 and then faded. A trace of albumin was found in the urine at this time. On June 7 the patient was symptom-free, with no jaundice and a normal lævulose-tolerance test. She was discharged from hospital and went away on holiday.

On Aug. 2 she returned from holiday and was readmitted complaining of sore throat and petechial rash. Blood examination revealed agranulocytosis and aplastic anæmia, which were the cause of her ulcerated throat. The temperature fluctuated about 101° F. and the pulse-rate about 110 per min. Daily transfusions of fresh blood, with intramuscular liver extract and pentnucleotide daily failed to influence the condition, and she died on Aug. 16. During this second period in hospital there was no jaundice.

CASE 3.—Married woman, aged 42, with history of three normal pregnancies. Started work at factory on Feb. 7, 1941. On April 20 she vomited and noticed dark urine; next day she noticed a tinge of jaundice and felt vague epigastric pain. She was admitted to hospital on April 25 with mild jaundice. The temperature and pulse-rate were subnormal and remained so. The liver was not palpable, but there was slight tenderness on pressure in the right subcostal region. The urine contained a trace of bile-pigments and the blood van den Bergh test was positive both direct and indirect. No other abnormality was detected. The jaundice persisted and the patient vomited once after admission. On

1. *Lancet*, 1916, 2, 1029.

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May 3 the liver edge was palpable. She was given glucose and insulin, and a light low fat diet. On May 14 the jaundice was deeper and the liver no longer palpable. On June 3 there were œdema of ankles and signs of ascites, and the patient was seriously ill. Paracentesis on the 4th yielded 10 pints of yellow fluid; on the 7th 21 pints of fluid was obtained. Six further paracenteses were performed between June 18 and Aug. 4, during which period the jaundice gradually subsided and the general condition improved. On Aug. 5 she began to pass more urine, and further paracentesis has been unnecessary. On Sept. 1 she was improving steadily, with no abdominal distension and no jaundice of the conjunctivæ, although skin pigmentation remained.

DISCUSSION

It seems that some people are much more susceptible to trinitrotoluene than others. It also seems probable that if workers do not develop some toxic manifestation in their first 6 months they will by then have acquired some immunity, if they are not naturally unsusceptible.

Moore [2] showed that the main channel of absorption is by the skin, and it is noteworthy that while dermatitis is common among workers at the factory not one of the patients in this series had been troubled by any skin eruption. Apparently there is a susceptibility or sensitivity of different tissues in different individuals.

The patient who died of acute liver necrosis had apparently a hyperplastic marrow, and yet the blood-picture showed only a very slight anæmia and no increase in reticulocytes; in the other fatal case, where the liver was apparently able to carry out most functions adequately, there was an aplastic blood-picture, but the marrow was not aplastic. Is it possible that the aplastic anæmia which rarely follows trinitrotoluene jaundice is due to inability of a damaged liver to supply some factor essential for hæmopoiesis? In any case, there seems to be justification for treatment with liver extracts during the jaundice. The best line of treatment of the developed condition is not easy to lay down, but the importance of prophylaxis is well recognised.[3] At the filling factory the precautions include protective overalls and gloves for workers, with supervision of washing of hands, arms, face, and neck after work; ventilation is augmented by a system of vacuum pipes with openings near every worker to remove dust and fumes; proper meals are provided in a canteen, and workers are encouraged to take outdoor exercise and a healthy diet. Work in actual contact with T.N.T. is alternated with other work, and weekly medical inspection is carried out to detect any signs of intoxication. Unfortunately patients may report sick to their home doctor without notifying the factory medical officer, and if they do not mention that they have worked with trinitrotoluene catarrhal jaundice or other lesion may be wrongly suspected and treatment delayed. The earliest possible diagnosis and removal of patients from contact seem to be essential if the present considerable mortality and morbidity are to be reduced.

SUMMARY

Seven cases of T.N.T. jaundice occurred in workers in an ordnance filling factory, of whom two have died.

The jaundice appeared within 6 months of beginning work at the factory, and was a typical orange yellow.

The associated symptoms were nausea, anorexia and epigastric discomfort; liver enlargement and pyrexia were absent, distinguishing the condition from catarrhal jaundice, with which it is likely to be confused.

Autopsy on the fatal cases revealed acute yellow atrophy of the liver and hyperplasia of the bone-marrow in one patient, and subacute liver necrosis and a hyperplastic bone-marrow in the other, whose death was due to aplastic anæmia.

Treatment was by glucose, insulin and vitamin C.

Prophylaxis is important, the main measures being protection of the skin, washing, adequate ventilation of factories, and a healthy life and full diet for workers.

I wish to thank my colleagues and the senior medical staff of the hospital for their help and encouragement.

2. Moore, B. *Proc. R. Soc. Med.* 1916–17, **10**, 37.
3. See *Lancet*, 1916, **2**, 1026 and 1021; and Legg, T. Industrial Maladies, London, 1934.

IMPROVED WEBSTER TEST FOR T.N.T. DERIVATIVE IN URINE

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THE test for trinitrotoluene (T.N.T.) derivative in the urine is that introduced by Webster [1] and later improved both by him [2] and by Tutin.[3] By a simple modification the sensitivity of the test may be enhanced and a positive result more frequently obtained. This modification consists simply in boiling the mixture of urine and sulphuric acid before adding the ether, thereby ensuring a more thorough extraction of the T.N.T. product from the urine. The test is further improved, and the chances of detection increased still more, by using four times the quantity of urine recommended by Webster. Here is the improved test in detail.

Place 50 c.cm. of urine in a convenient sized beaker (400 c.cm.) and add 50 c.cm. of 20% (by volume) sulphuric acid (1 part conc. H_2SO_4 + 4 parts H_2O). Mix.

Place beaker on tripod, supported by wire gauze, and heat over bunsen flame till the liquid boils.

Boil for one minute; allow to cool. Cooling may be hastened by running cold water over outside of beaker.

After cooling pour the mixture of urine and acid into a separatory funnel of 200 c.cm. capacity and add 50 c.cm. of ordinary (methylated) ether. Shake up well and then allow to settle for about 15 minutes. The lower layer of urine and sulphuric acid is next run off by removing the top stopper and opening the lower tap.

The ethereal solution of acidified urine remaining in the separatory funnel is then washed twice with 1% aqueous solution of sodium carbonate. This is done as follows. Add 20–25 c.cm. 1% aqueous sodium carbonate, shake up, and after allowing to settle for 5–10 min. run off the lower layer. Repeat. (If the person has been taking purgatives such as rhubarb, senna, cascara, phenolphthalein — which yield anthraquinone derivatives—the sodium carbonate solution will show a reddish violet colour.)

After this treatment with sodium carbonate the ethereal solution in the funnel is washed with water, as follows. Add 50 c.cm. tap water, shake up, allow to settle for 15 min., then run off the lower layer as before. (Occasionally a troublesome emulsion forms in the ethereal extract while washing with water but it is easily dispersed by adding a few drops of absolute alcohol and shaking gently.)

Now place 5 c.cm. of the ethereal extract, so washed and prepared, in a test-tube and quickly add, without shaking, 5 c.cm. of a 5% alcoholic solution of potassium hydroxide (5 g. caustic potash dissolved in 100 c.cm. of methylated spirit or absolute alcohol). A violet cloud indicates a positive result. The liquid in the test-tube should be watched carefully, for the colour develops quickly and just as quickly fades. The intensity of the colour varies from the faintest tint to a deep violet according to the amount of T.N.T. in the urine.

The unused ethereal extract remaining in the separatory funnel need not be thrown away but may be collected and later separated off from any T.N.T. by distillation. It may then be used again in other tests.

For the routine everyday urine examination of workers in T.N.T. factories the technique may be simplified as follows.

Apparatus required: Two ordinary test-tubes (7 in. × ¾ in); Bunsen burner or spirit lamp.

Reagents required: 20% (by volume) sulphuric acid; ordinary (methylated) ether; 5% alcoholic solution of potassium hydroxide (freshly prepared).

Place about 10 c.cm. of urine into one test-tube; add about an equal quantity of the 20% sulphuric acid; shake and bring to the boil; cool thoroughly under the water tap.

When cold add about 10 c.cm. of the ether and shake well; allow to stand a few minutes till ether floats to the top. Pour some of the supernatant ether into the other test-tube and to it add about 2 c.cm. of the 5% alcoholic potassium hydroxide solution. A dirty reddish purple colour develops *at once* if T.N.T. is present. The tint varies from faint to

1. Webster, T. A. *Lancet*, 1916, **2**, 1029.
2. Webster, *Spec. Rep. Ser. med. Res. Coun. Lond.* No. 53, 1921.
3. Tutin, F. *Lancet*, 1918, **2**, 554.

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very deep according to the amount of T.N.T. present and appears quickly and just as quickly fades. If no T.N.T. be present a light brown colour only results and persists.

With this simplified technique the test is sensitive to 1 part in 10,000. It does not exclude anthraquinone derivatives (from the purgatives mentioned), which give a similar but pinker colour which persists.

TRIGEMINAL NEURALGIA

A SUGGESTED BASIS OF TREATMENT

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THE view, which many have held, that the paroxysms of trigeminal neuralgia are ischæmic in origin has never received convincing support. Even Leriche (1939), who favours this view, admits that the treatment of trigeminal neuralgia by sympathectomy, with the object of producing a vasodilatation of the trigeminal vessels, offers little hope of success. Nevertheless there is increasing evidence, both physiological and pathological, that the normal functioning of peripheral nerves is dependent upon the integrity of their blood-supply. Koch (1926) has shown that ischæmia of mammalian nerve produces significant physiological changes in the nerve, and that when the ischæmia disappears the nerve returns again to normal. Should the ischæmia persist, as in pathological occlusion of the vasa nervorum, more permanent effects result (Woltman and Wilder 1929, Randall 1938, and others).

Unfortunately, little is known concerning the detailed vascular supply of peripheral nerves. In the trigeminal, however, the Gasserian ganglion has been shown to be very vascular (Stöhr 1928) and to receive its supply from the internal carotid artery, while the remainder of the nerve resembles nerves elsewhere in receiving a regional blood-supply (Grigorowsky 1928). Since physiological and pathological evidence suggests that the blood-supply of any nerve is not only adequate but also essential for its normal requirements, it seems to us that ischæmia of a nerve, whether angiospastic or otherwise should be considered as a possible factor in peripheral nervous lesions where no other obvious cause presents itself. In the case of trigeminal neuralgia this hypothesis deserves the fullest investigation, and should not be rejected merely because of the failure of cervical sympathectomy.

The success which has recently been obtained in angiospastic conditions such as Menière's disease (Atkinson 1941), and even in one case of trigeminal neuralgia (Cooper 1938), by exhibiting vasodilator drugs over long periods encouraged us to explore the possibilities of this form of treatment in trigeminal neuralgia. In the first cases which were available we tried to induce the paroxysmal pain by administering the vasoconstrictor drugs, adrenaline and benzedrine, believing that its production in this way would suggest an angiospastic basis. Abolition, then, of both the induced and spontaneous pains would afford not only circumstantial support for our theory but also a new means of alleviating the pain in those cases which show such vasomotor responses. Because it has been found in Menière's disease and nerve deafness to be the most effective vasodilator, we relied mainly on nicotinic acid, and not on acetylcholine which was used by Cooper in trigeminal neuralgia. In cases 4–7 treatment with nicotinic acid was begun at once in an attempt to stabilise the dosage. It was found, however, that there is considerable individual variation in the response to this drug, and, unless relief was obtained earlier, it was at times necessary to increase the dosage until signs of generalised vasodilatation appeared.

CASE-RECORDS

CASE 1.—A woman, aged 52, with 2½ years' history of supraorbital pain of typical paroxysmal type, accompanied by a facial tic. Thorough examination revealed no cause for the symptoms. Blood-pressure 135/95 mm. Hg.

During an intermission of the symptoms a preliminary injection of 0·7 c.cm. of 1 in 1000 adrenaline induced, almost immediately, supraorbital pain—resembling in every respect the usual spontaneous pain—with tenderness over the supraorbital notch. During a subsequent spontaneous paroxysm 50 mg. nicotinic acid was given by mouth with no apparent effect. After 40 minutes a further 50 mg. was administered; this resulted in some diminution of the pain after 20 minutes, but did not abolish it. A capsule of amyl nitrite was then given. This produced striking, almost instantaneous relief—the pain disappeared completely, to the delight of the patient who was able to sleep without a sedative for the first time in many weeks. Although she was convinced of the efficacy of amyl nitrite, it was nevertheless probable that it merely augmented the effect of the previous subliminal doses of nicotinic acid. Treatment by nicotinic acid, 50 mg. t.d.s., was then continued, and during the 10 days that the patient was under our observation there was no recurrence of the pain. Injections of adrenaline during this period were ineffective. As in Cooper's case, the facial tic was not influenced by the treatment.

CASE 2.—A woman, aged 68, with 2½ years' history of trigeminal neuralgia involving the second division of the nerve. Blood-pressure 150/105 mm. Hg.

At first the patient was given benzedrine sulphate, 5 mg. b.d. The paroxysms became considerably more frequent, and she complained bitterly of their increasing severity. On two occasions a capsule of amyl nitrite relieved the paroxysms. The benzedrine was then stopped and nicotinic acid given, 50 mg. b.d. Over a number of days this treatment reduced the paroxysms in frequency (from 15–20 a day to 3 or 4) and in severity.

CASE 3.—A man, aged 48, with 5 years' history of trigeminal neuralgia involving the second division of the nerve. After a remission of 2 years the pain had returned with its original severity. It appeared 5 or 6 times a day and lasted 1–3 hours. Blood-pressure 130/90 mm. Hg.

Treatment with nicotinic acid, 50 mg. b.d., was started at once and had a definite effect. Apart from one paroxysm shortly after the treatment began, the patient had complete freedom from pain for 4 days. During this time attempts were made to induce the pain by injection of adrenaline but without effect. After 4 days the nicotinic acid was stopped and he was put on benzedrine sulphate 5 mg. t.d.s. Attacks of pain recommenced and increased gradually in frequency and severity as the benzedrine was continued. Attempts to relieve the paroxysm during this time by giving acetylcholine were without success, probably because it was unable to counteract the constrictor effect of the benzedrine.

CASE 4.—A woman, aged 49, with 1 year's history of paroxysmal neuralgia of the second division of the trigeminal nerve. Blood-pressure 138/90 mm. Hg.

Treatment with nicotinic acid, 50 mg. b.d., was begun on July 14, 1941. This was without effect. The dose was then increased to 50 mg. q.d., which produced considerable relief; further improvement resulted on again increasing the dose to 75 mg. t.d. The dosage has subsequently varied between 75 mg. t.d. and 75 mg. q.d. according to the subjective responses. This resulted in progressive improvement leading to almost complete relief by the end of the second month of treatment. This has since been maintained, and treatment is still continuing.

CASE 5.—A woman, aged 62, with neuralgia of the first and second divisions of the trigeminal nerve over a period of several years. The pain was typically paroxysmal with short intermissions of almost complete relief. Blood-pressure 140/85 mm. Hg.

Treatment with nicotinic acid, 50 mg. b.d., began on June 19, 1941. At the end of a month the paroxysms had lessened in frequency and severity. An increase during the second month to 50 mg. t.d. resulted in further improvement, the patient sleeping better than she had for several months. A further increase to 50 mg. q.d. has resulted in almost complete relief except for very occasional "stabs" of pain. Treatment is continuing.

CASE 6.—A woman, aged 39, who had been a nurse, with trigeminal neuralgia involving the second and third divisions. Unerupted wisdom teeth had been removed with no effect. Paroxysms occurred every 2–3 weeks and lasted from 1–2 hours to 10 days. Blood-pressure 130/80 mm. Hg.

She was first seen on Sept. 3, 1941, during the onset of a paroxysm, which responded dramatically to inhalation of amyl nitrite, disappearing in a little over a minute. She was then placed on nicotinic acid, 50 mg. q.d.; in just over 3 weeks this has considerably reduced the severity but not the frequency of the paroxysms. Treatment is continuing.

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CASE 7.—A man, aged 66, with 1 year's history of typical paroxysmal neuralgia of the second division of the trigeminal nerve. For the last 2 months of this period paroxysms had been occurring daily. Blood-pressure 130/85 mm. Hg.

Treatment with nicotinic acid, 50 mg. q.d. began on Sept. 24, 1941, and resulted in complete relief after 10 days. Since then there has been no recurrence of pain, this period of relief being considerably longer than any previous period of complete remission. The treatment, which is continuing, has been particularly effective in this case and has considerably impressed the patient himself.

SUMMARY

On the hypothesis that the paroxysms of trigeminal neuralgia are ischæmic in origin we have attempted the treatment of this condition by vasodilator drugs.

We treated 7 patients—2 men and 5 women—whose ages ranged from 39 to 62 and in whom attacks had occurred over periods of 1–5 years.

Nicotinic acid was used in doses ranging from 50 mg. twice daily to 75 mg. four times daily. In every case there was improvement, sometimes amounting to complete relief. This improvement has been generally maintained. In 2 cases a paroxysm at its height was relieved in a few minutes by an inhalation of amyl nitrite.

Vasoconstrictor drugs (adrenaline, benzedrine) were given in 3 cases; in one, adrenaline provoked an attack before treatment with nicotinic acid had begun but failed to do so afterwards; in the other 2, benzedrine increased the number and severity of the paroxysms.

We wish to thank Prof. J. le F. Burrow and Prof. T. Talmage Read of the University of Leeds for allowing us to see cases of trigeminal neuralgia.

REFERENCES

Atkinson, M. (1941) *J. Amer. med. Ass.* **116**, 1753.
Cooper, M. J. (1938) *Amer. J. med. Sci.* **195**, 83.
Grigorowsky, I. M. (1928) *Z. ges. Anat.* I. **87**, 728.
Koch, E. (1926) *Z. ges. exp. Med.* **50**, 238.
Leriche, R. (1939) The Surgery of Pain. Translated by A. Young, London.
Randall, L. O. (1938) *J. biol. Chem.* **125**, 723.
Stöhr, P. (1928) v. Möllendorff's Handbuch der mikroskopischen Anatomie des Menschen, Berlin, vol. IV. part 1, p. 213.
Woltman, H. W. and Wilder, R. M. (1929) *Arch. intern. Med.* **44**, 576.

INFLUENCE OF MENSTRUATION ON SUSPENSION STABILITY OF RED CELLS

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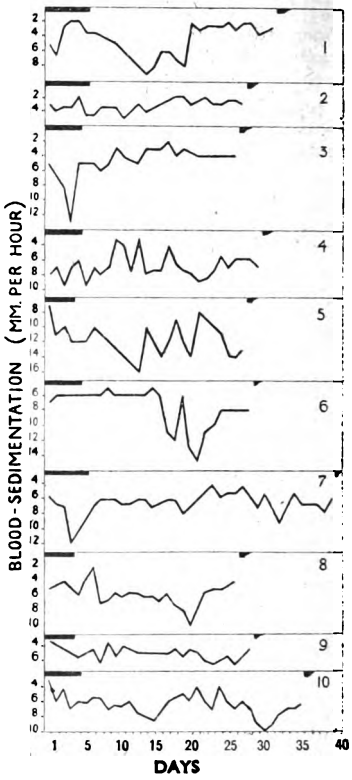
THE measurement of the suspension stability of erythrocytes by their sedimentation-rate has become so important in checking the course of so many diseases that any factor, other than the disorder under observation, which may influence the rate might cause errors in prognosis and treatment. Such extraneous influences are intercurrent infections and anæmia. Infections are usually easy to exclude by clinical observation, while compensation for anæmia is easy.

It was observed by Hippocrates that the sedimentation-rate of the erythrocytes of pregnant women was abnormally high, an observation which led to the bleeding of these unfortunates even into the nineteenth century. This and other considerations have given rise to a suspicion that one or more of the endocrine glands may affect the rate, either by changing the fibrinogen-globulin content of the plasma proteins or by altering in some other way the electrical conditions at the erythrocyte-plasma interface. Should the offending endocrine factors be either œstrone or progesterone one would expect to see a constant change in B.S.R. during the menstrual cycle. That such a change does occur has often been guessed or assumed, but only three references to the subject have been published. Whitby and Britton[1] said that the sedimentation-rate is increased slightly at the menses. Day[2] asked "Why do a few women show an exalted blood-sedimentation rate during their menses, whereas most women are entirely unaffected?" Lockett,[3] on the other hand, stated that the velocity reached a maximum a day or two before the beginning of menstruation. I cannot find that anyone has tried to settle the question by direct experiment.

1. Whitby, L. E. H. and Britton, C. J. C. Disorders of the Blood, London, 1939.
2. Day, G. *Lancet*, 1940, 1, 1160.

INVESTIGATION

Fifteen volunteers were carefully questioned and examined. Of these, 10 were finally chosen as above suspicion of harbouring any abnormality known to influence the suspension stability of their red cells. With one exception they were nurses whose medical history was already known and who had previously undergone periodical medical examination. Their ages ranged from 20 to 35, the average being 23. All claimed to have normal and regular periods, but in fact there was considerable variation in the length of their menstrual cycles.



The B.S.R. of each was measured every day of a complete cycle by Westergren's standard technique. Correction for anæmia was unnecessary in these cases. The results are shown in the figure, which make it clear that no *constant* alteration in erythrocyte stability is associated with any phase of the cycle—a fact evident without statistical analysis. It is possible, however, that so short a series may fail to bring out an average change. In order to test this possibility the cycle of each subject was divided into four phases: phase 1, which included menstruation, was from the first day of the cycle to the midpoint between this and the presumed date of ovulation; phase 2 was thence until ovulation; phase 3 covered the first half of the luteal phase; and phase 4, the second half of the luteal phase, ending at menstruation. The average B.S.R. for each period was calculated for each subject (see table).

Case	Phase 1	2	3	4	Av.	Case	Phase 1	2	3	4	Av.
1	3·5	6·5	4	2·5	4·125	7	7·5	6	6	6·5	6·5
2	3·5	4	3	2·5	3·25	8	5	5·5	6·5	6	5·75
3	7	4·5	3·5	4	4·75	9	4	4·5	4·5	5·5	4·625
4	8	6	7·5	6·5	7	10	5·5	6·5	6	8	6·5
5	10·5	13	12	11·5	11·75						
6	6	6	9·5	8·5	7·5	Av.	6·05	6·25	6·25	6·15	6·175

These figures make it clear that there is no significant variation at any period of the menstrual cycle.

SUMMARY

The red-cell sedimentation-rate was measured on every day of the menstrual cycles of 10 healthy women. The figures obtained show that, contrary to general belief, there is no change in the suspension stability of erythrocytes characteristic of any phase of the cycle.

I wish to thank the Westminster and Middlesex Hospital nurses who allowed themselves to be subjected to inconvenience by this investigation, and Prof. S. Zuckerman and Mr. P. C. Williams, D.Sc., for their advice on the presentation of the figures.

3. Lockett, M. F. *Brit. J. Tuberc.* 1937, **31**, 31.

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CONCENTRATED SERUM IN HEAD INJURIES

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A CONCENTRATED solution of human serum was suggested as a valuable agent in reducing raised intracranial pressure by Hughes, Mudd and Strecker in 1938. They made observations on patients with raised pressure, chiefly sufferers from cerebral tumour, and found that the reduction of pressure continued for longer after injection of serum than after 50% sucrose solution. This use of concentrated serum seems to have been largely neglected, probably because of difficulty in obtaining it. Now, as a result of the M.R.C. blood-transfusion service, concentrated serum can be reconstituted from the dried serum which is prepared on a large scale for ease of storage and transport. I have used concentrated serum as a means of reducing intracranial pressure in a small series of patients suffering from head injuries.

METHOD

Five-times concentrated serum has been used; this is made by adding 40 c.cm. of sterile distilled water to the dried solids obtained from 200 c.cm. of human serum. There is some difficulty in getting the dried serum to dissolve in this small quantity of water but if the mixture is shaken well and left in the incubator for an hour, solution will take place. In each case 40 c.cm. of reconstituted concentrated serum has been injected intravenously. It is important to keep the serum at blood temperature till the injection is given, otherwise the solution becomes viscid and difficult to inject; 2–3 minutes have usually been taken for the injection of 40 c.cm. Since the serum is obtained from pooled blood no preliminary blood-grouping is necessary.

The cases treated have been men with recent closed head injuries in whom severe headache with a high cerebrospinal-fluid pressure has been present. They have previously been treated by dehydration, magnesium-sulphate enemas and ordinary analgesics. Serum has only been used when these measures have failed to relieve their symptoms. Cases of this type are comparatively uncommon, and care must be taken that compressive lesions are not present before serum is administered.

Repeated lumbar punctures have been used to estimate fall of pressure, though these have not been repeated as often as scientific accuracy would demand because of the condition of the patients. This method was criticised when Hughes and his colleagues (1938) originally presented their results to the American Neurological Society, and more recently by McKissock (1941), the main criticism being that the fluid may continue to escape through the hole in the dura made at each puncture and that this leakage may cause a fall of pressure. Hughes and his colleagues did a control series of experiments in dogs, using continuous lumbar-puncture recording, and found that their results from repeated puncture were confirmed by the continuous record. We have found that in late punctures after serum administration the C.S.F. pressure may rise after an earlier fall, and this suggests that continued leakage of C.S.F. cannot be an important factor in determining the fall of pressure. A continuous lumbar-puncture record has scientific advantages over repeated punctures, but I have not felt justified in attempting it in the rather restless post-traumatic patients to whom serum has been given.

RESULTS

Blood dilution.—The degree of dilution of the blood has been estimated by hæmatocrit readings. All the blood samples taken from a patient have been centrifuged at the same time at the end of the period of observation so that comparable readings would be obtained. Examples of hæmatocrit readings in these cases, expressed as percentage of packed cells, were:

Before serum	52	42·5	41	47	47
Time after serum					
70 min.	49	41	36	37	47
3 hr.	..	41	..	43	..
6 hr.	46	..	37	44	47
8 hr.	..	42	40	..	..
18 hr.	52	..	..	..	..

It will be seen that about 5% dilution of the blood had usually occurred after 70 min. Sufficient readings have not been made yet to enable us to say for how long dilution continues or when the hæmatocrit readings return to normal. In the last case no dilution of the blood took place.

Lumbar-puncture pressure.—A group of 6 patients were treated in this way. Lumbar puncture pressures, expressed in mm. of water, were as follows:

Case no.	1	2	3	4	5	6
Before serum	280	200	275	235	300	300
Time after serum						
70 min.	230	150	80	145	..	300
3 hr.	..	180	75	..	250	300
6 hr.	150	..	110	..	300	..

In 5 cases there was a fall in C.S.F. pressure. In case 6 the pressure was very high at the beginning and no fall was obtained, and in this case also no dilution of the blood was shown by hæmatocrit readings. It is possible that a larger amount of serum should have been given to this man. The most considerable fall of pressure was obtained in case 3 where it fell from 275 to 80 mm. in 80 min. and remained at 75 mm. 3 hours after injection; 6 hours afterwards it had risen to 110 mm.

Clinical results were good except in case 6 where the lumbar-puncture pressure remained unaltered and the clinical condition unchanged. In 4 of the cases severe headache was the outstanding symptom and was dramatically relieved, though it was noticeable that the lumbar-puncture pressure had fallen before the headache started to decrease; usually the pain became less some 70–90 minutes after the serum had been injected, and had stopped in 2 hours. In 2 cases there was never any return of headache, but in the other 2 there was some return of pain a few days later. In case 5 headache was not an outstanding feature but this man was abnormally drowsy with rapidly developing focal signs due to contusion of the left parietal lobe. His drowsiness became less and there was no further increase in his parietal syndrome after the administration of serum. The pulse-rate remained unchanged after serum administration even when, as in most of the cases, it had been abnormally slow before serum was given. This supports Denny-Brown's (1941) thesis that the slow pulse-rate in these cases is not the direct result of raised intracranial pressure but is due to some other factor—he suggests medullary contusion.

No untoward result of serum injection has been seen except that one man developed local urticaria in the arm into which the injection was being given. The patients have been noted to be unusually constipated after treatment, presumably as a result of withdrawal of fluid from the bowel.

Concentrated human serum has thus undoubtedly been of value in reducing the raised intracranial pressure and in improving the clinical condition, especially in relieving headache, in this small group of acute head injuries. The protein content of the injected serum is high—30–35 g. per 100 c.cm. according to our estimations—and from the hæmatocrit studies of the blood after injection of the serum it is evident that dilution of the circulating blood occurs, presumably as a result of the osmotic properties of the serum. This hydration of the blood occurs by removal of fluid from all parts of the body, and the fall in lumbar-puncture pressure shows that either the tissue fluids of the nervous system or the C.S.F. have had fluid removed from them: from which of them is still undetermined.

The value of hypertonic sucrose solution has not yet been compared in this hospital with that of concentrated serum, but Hughes and his colleagues in their studies had no doubts of the greater efficacy of concentrated serum.

SUMMARY

Concentrated serum was used in 6 cases of recent closed head injury as a means of reducing intracranial pressure.

Dilution of the blood occurred and in 5 patients there was a fall of pressure in the cerebrospinal fluid.

The clinical results, especially relief of severe headache, were good and the intravenous injection of concentrated

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serum seems to be indicated in cases of recent closed head injury where the C.S.F. pressure is high.

I wish to thank Mr. Harvey Jackson, director of this E.M.S. head-injury centre, for permission to treat patients under his care, and Dr. E. A. Carmichael for his assistance in the preparation of the paper.

REFERENCES

Denny-Brown, D. (1941) *Lancet*, **1**, 371.
Hughes, J., Mudd, S. and Strecker, E. A. (1938) *Arch. Neurol. Psychiat., Chicago*, **39**, 1277.
McKissock, W. (1941) Communication at British Society of Neurological Surgeons.
Wright, D., Bond, D. and Hughes, J. (1938) *Arch. Neurol. Psychiat., Chicago*, **39**, 1288.

HÆMOTHORAX FROM LEAKAGE OF A DISSECTING AORTIC ANEURYSM

SURVIVAL

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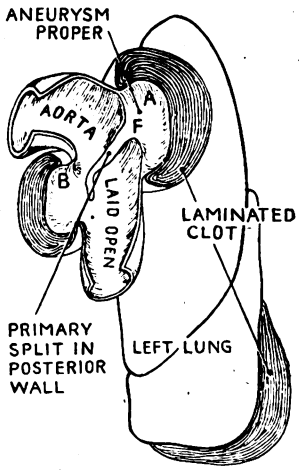
SPONTANEOUS hæmothorax has been fully described by Jones and Gilbert (1936), Hopkins (1937), Perry (1938), and Davidson and Simpson (1940), who showed that the tearing of a vascular pleural adhesion was the commonest cause. Dissecting aneurysms of the aorta often rupture into the pericardium, but another common terminal event is the production of a hæmothorax, which is more often on the left side than the right. Cases of dissecting aneurysm are reviewed and discussed by Weiss (1935), Glendy, Castleman and White (1937) among others, and East (1939) has described the clinical features as they emerge from a survey of the literature. Survival for more than a few days after the production of a hæmothorax due to the leaking of a dissecting aneurysm, as in the following case, does not seem to have been described.

An unemployed man, aged 51, was admitted to Whipps Cross Hospital on March 17, 1941, his doctor having made a diagnosis of left pleural effusion. In 1924 he had been diagnosed at the London Hospital as having disseminated sclerosis of two years standing; his blood Wassermann reaction was negative. Subsequently his symptoms had become more severe, and for many years he had been confined to his room owing to difficulty in walking.

On admission, he gave a 4 days' history of shivering, slight cough and a little sputum, which he swallowed. On the day before admission, while groping about in his room, he had stumbled and hit his chest in the region of his left armpit against a bedpost. There was only a little pain, which had become less since the accident. He had not experienced any shortness of breath. He was pale and anxious, and showed signs of disseminated sclerosis—spastic paraplegia, stiffness of hands, pupil abnormalities, and rigidity of the trunk, which made examination of the back of the chest somewhat difficult. Occasionally rapid pulsations were visible in the epigastrium, about 160 per minute, but these bursts did not alter the radial pulse-rate of about 86. There was no fever and no abdominal rigidity. In the chest there was impaired percussion note, distant bronchial breathing and bronchophony in the left lower zone of the back, suggesting consolidation of the left lower lobe, but a radiogram taken two days later showed opacity of the whole left side of the chest, which suggested fluid though there was no mediastinal displacement. Clinically, some bulging of the left chest had developed, with a dull percussion note all over the back and lower part of the front, diminished breath sounds, absent vocal fremitus and whispering pectoriloquy. On needling the chest, fluid indistinguishable from blood was obtained; this did not clot on standing and proved sterile on culture. No fracture of ribs was seen in a further radiogram. On March 25, 500 c.cm. of blood was aspirated from the left pleural cavity, when the patient became collapsed, pale and sweating, and the procedure had to be stopped. The patient's cough ceased; he never produced any sputum. Urinary incontinence and bedsores began to develop. On April 8 a further 600 c.cm. of blood was aspirated, and at the same time 400 c.cm. of air was introduced into the left pleura. A subsequent radiogram still showed opacity in the left lower zone with mediastinal displacement to the left. No abnormal signs in the upper lung-zone or about the aortic knuckle were revealed by the partial artificial pneumothorax. The patient's general condition was so poor that further investigation into the cause of his hæmothorax was neither feasible nor justifiable. In spite of intensive treatment with iron he became increasingly pale, the bedsores became more and more offensive, and after developing a swinging temperature he died on May 23, nine weeks after admission.

Autopsy carried out by Dr. Keith Simpson 12 hours after death showed that the cause of death was toxæmia from extensive pressure sores secondary to disseminated sclerosis, evidence of which was found in the brain. There was no fluid in the left pleural cavity, but the lobes of the left lung which showed no disease otherwise, were compressed by aseptic blood-clots. One of these was lying in the costophrenic sulcus, while the other one was found in the left paravertebral gutter, partly adherent to the third part of the aortic arch. This clot was laminated, and about 3 in. in diameter. The arch of the aorta, when opened, presented the appearances of hyaline necrosis of the media, without atheroma or syphilitic scarring. There was a healed split of the intima near the end of the third part of the arch, and a short dissection, 2½ in. long, had occurred, producing a local subadventitial aneurysm which was adherent to the clot previously described.



In the figure points A and B of the aneurysmal bulge at the end of the third part of the aorta are complementary. The wall, consisting of adventitia, leaked, causing the hæmothorax and the residual clots over lung apex and base. The scar in the base of the primary split consists of media plus adventitia, the intima alone being split at all points except F.

There is little doubt that, if it had not been for his disseminated sclerosis, the patient would have survived this accident. There is a history of slight injury to the chest, but as this occurred on the third day of respiratory symptoms, trauma was not accepted as a cause of the dissecting aneurysm or of its rupture. Moreover there was no history suggestive of acute blood loss, though in all 1100 c.cm. of blood was evacuated from the chest, and signs of effusion became gradually more conspicuous after admission. It seems justifiable to assume that slow leakage from the dissecting aneurysm took place, and that this allowed the patient to survive the catastrophe, without producing either the dramatic clinical developments seen in most cases of spontaneous hæmothorax, or the severe pain usually, but not always (Hamburger and Ferris 1938), associated with dissecting aneurysm.

I wish to thank Dr. Kenneth Perry for his help and advice; Dr. Keith Simpson for allowing me to make use of his post-mortem findings and the diagram drawn by him; and Mr. O. R. M. Kelly, medical superintendent of Whipps Cross Hospital, for permission to publish the case.

REFERENCES

Davidson, M. and Simpson, C. K. (1940) *Lancet*, **1**, 547.
East, T. (1939) *Ibid*, **2**, 1017.
Glendy, R. E. Castleman, B. and White, P. D. (1937) *Amer. Heart J.* **13**, 129.
Hamburger, M. Jun. and Ferris, C. B. Jun. (1938) *Ibid*, **16**, 1.
Hopkins, H. V. (1937) *Amer. J. med. Sci.* **193**, 763.
Jones, O. R. and Gilbert, C. L. (1936) *Amer. Rev. Tuberc.* **33**, 165.
Perry, K. M. A. (1938) *Lancet*, **2**, 829.
Weiss, S. (1935) *Med. Clin. N. Amer.* **18**, 1117.

On Oct. 17 Lord Rosebery opened the Paderewski Polish Hospital which stands in the grounds of a big general hospital in Midlothian and has 80 medical beds which are open to Polish civilian and military patients. Surgical wards and operating theatres in the main building complete the hospital, which will also offer teaching facilities to the Polish medical faculty.

". . . Every age is, I suppose, an age of doubt from some point of view . . . The Mid-Victorian age believed in Moses and doubted Darwin. The present age believes in Freud and doubts Moses."—Y. Y., *New Statesman*, Oct. 25, p. 375.

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A CASE OF PTERYGO-NUCHAL INFANTILISM

(TURNER'S SYNDROME), WITH POST-MORTEM FINDINGS

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AN unusual syndrome, not previously described, was reported by Turner in 1938. His 7 cases were all females and showed the triad of infantilism, webbing of the skin of the neck, and cubitus valgus. Apart from the curious appearance due to the webbed neck, the main interest of this condition lies in the associated infantilism. Turner was of the opinion that the anterior pituitary was to blame, and thought his cases corresponded to the Lorain-Levi type of dwarfism. The present paper describes a case who has been studied for some years and whose death from tuberculosis has afforded the first opportunity for pathological examination.

CASE-HISTORY

A woman, aged 21, was first seen on Oct. 5, 1937. Her birth had been normal and she had walked, talked and teethed at the normal age. A deformity of her neck had been noticed since birth. Secondary sex characteristics had not developed and she had never menstruated. Flushes, 3–4 a day, had been present for 3 years. She was quite intelligent, but preferred childish pursuits. The mother, father and two younger siblings were normal. On examination her height was 56½ in. and weight 112 lb. She appeared a short heavily built girl and was not disproportionate, though the arms seemed longer than normal. The photograph reproduced in fig. 1 was taken later when she had lost much weight from tuberculosis. The most striking feature was a deformity of the neck; from the mastoid process to the acromion was a well-marked wing which appeared to consist of skin and subcutaneous tissue only. The trapezius muscle was normal and the movements of the neck were full in flexion and extension, while lateral movement was slightly limited. The hair line was low and the skin was freely movable over the lower part of the occipital bone. The concha of the left ear projected laterally and anteriorly, and the upper parts of both auricles were bound to the margin of the scalp. Kyphoscoliosis with prominence of the sternum was present, and there was an increase of the carrying angle of the elbow. The skin was smooth and normally moist, and there were a number of pigmented moles on the face and body. There was no axillary hair, but a scanty growth was present in the pubic region. The breasts were quite undeveloped, no glandular tissue being palpable. The labia were infantile, the vagina short and small, and the cervix was small but dilated easily when full gynæcological investigation was done. It was found that the uterus was 1 in. long and the walls very thin: uterine scrapings were too scanty for histological section. The ovaries could not be felt. Biopsy of the vaginal mucosa showed that the epidermis was flat, and there was little cellular activity in the malpighian rete. There was considerable lymphocytic infiltration underlying the epidermis, and mucous glands were inconspicuous. Blood count and blood chemistry were normal. X rays showed a normal cervical spine, sella turcica and pelvis; the distal epiphyses of the radius and ulna were ununited, and the epiphyses of the second and third lumbar vertebræ were not fully united.

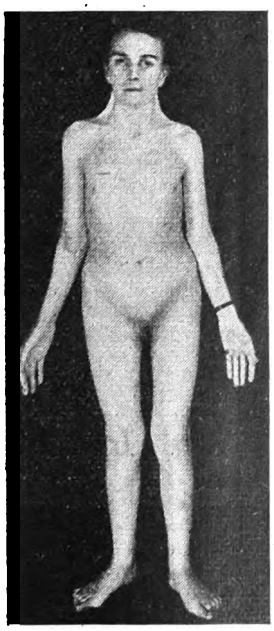

FIG. 1—Turner's syndrome.

Thyroid function.—Basal metabolic rate was +7% blood-cholesterol 160 mg. per 100 c.cm., and the electrocardiogram was normal. Injection of a pituitary thyrotrophic extract (Sharpey-Schafer and Schrire 1939a) caused a rise of temperature and pulse on the sixth day; the thyroid became enlarged and tender and the B.M.R. rose to +43%.

Carbohydrate metabolism.—A sugar-tolerance test showed a fasting blood-sugar of 71 mg. per 100 c.cm. and 130, 106, 96, 93 mg. % at 30-min. intervals after the ingestion of glucose. After 10 days on a diet containing 35 g. of carbohydrate a day, the figures were 65, 184, 230, 172, 125, suggesting a normal response of the anterior pituitary to a low carbohydrate diet (Himsworth 1939).

FIG. 2—Klippel-Feil syndrome.

Gonadal function.—Urinary creatinine excretion was normal (Sharpey-Schafer and Schrire 1939b). A gonadotrophic pituitary extract was injected for 10 days, followed by a follicle stimulating extract for 14 days. Biopsy of the vaginal mucosa showed slight diminution of the sub-epithelial infiltration with small round cells. There were no other changes. Œstradiol benzoate, 100,000 I.B.U., was injected twice weekly, and 15,000 I.U. of œstriol daily by mouth were given for 9 months At the end of 5 months the uterus had enlarged and there was intermittent uterine hæmorrhage. There was no development of the breasts or further development of body hair. After an interval of 3 months, the effects of large doses of testosterone propionate on her spontaneous flushes was studied. These data have been published elsewhere (Sharpey-Schafer 1940).

In August, 1940, she was readmitted to hospital complaining of loss of weight and fatigue for 2 months. She was found to be running an irregular fever and the spleen was palpable. The diagnosis remained obscure for some time, but eventually revealed itself as extensive tuberculosis of the abdominal cavity. Terminally there was a miliary spread.

Autopsy (Dr. T. H. Belt and Dr. Popjak) was performed 5 hours after death. The body was that of an extremely emaciated woman. There were many pigmented moles all over the body and two verrucæ pilosæ on the upper lip. There was a web on each side of the neck, running from the mastoid process to the acromion. The breasts were infantile. The heart and aorta were hypoplastic, the weight of the former being only 166 g. There was generalised (miliary) tuberculosis involving the lungs, intestines and peritoneum, liver, urinary bladder, left ureter and kidney, and long-standing tuberculous salpingitis with involvement of ovaries and uterus. The uterus, though filled by caseous material, was very small, 1¾ in. in length. Apart from a calcified nodule in the apex of the left lung, the oldest tuberculous lesion seemed to be that of the internal genitalia. The endocrine glands, apart from the ovaries, did not show any gross pathological changes. The left ovary could not be found in the masses of tuberculous granulation tissue.

Histology.—No functioning ovarian tissue could be distinguished in the right ovary. The endometrium was destroyed by tuberculosis. The histological appearances of the pituitary gland, thyroid and adrenals were not abnormal. The mammary glands consisted of simple and branching lactiferous ducts embedded in a dense collagenous tissue. The web of the neck consisted simply of a fold of the skin without muscle.

DISCUSSION

Webbing of the skin of the neck was first described by Kobylinski in 1883. Funke (1902) and Bussière (1902) reported single cases. Frawley (1925) described the condition in 2 sisters and 2 other females, and Chandler (1937) has reviewed the literature. Simple webbing of the neck must be distinguished from the similar webbing that may occur in the Klippel-Feil syndrome. Since the original description of this last condition in 1912, 133 cases have been reported (Rechtman and Horwitz 1940). In the Klippel-Feil syndrome synostosis of some or all of the cervical vertebræ, with

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limitation of movement, is present, and although numerous other congenital abnormalities may be associated, infantilism has not been reported. A photograph of a girl of eleven with the Klippel-Feil syndrome is shown in fig. 2 for comparison. Apart from a similar webbing of the neck, this girl had kyphoscoliosis and the second, third and fourth cervical vertebræ were fused; she has since shown normal sexual development.

In simple webbing and in Turner's syndrome the cervical spine is always normal. The ætiology of web formation is obscure; some have attributed it to amniotic adhesions or bands, and Nageotte-Wilbouchewitch (1934) thought that it might be a form of atavism, since it occurs normally in the chimpanzee. MacCollum (1938) considers that the defect may arise about the third month of pregnancy, when the ventral and dorsal surfaces of the neck are long and the mastoid process is either lateral or in a direct vertical line with the region of the acromial process, and when the skin over the lateral surfaces of the neck is shortened. As the shoulders develop, it is possible for the skin to remain shortened and for a web to develop between the mastoid and acromion. He points out that the symmetrical nature of this deformity favours some such theory.

The clinical and pathological evidence in my case suggests that the infantilism was primarily of gonadal origin. Tests of anterior pituitary function and the histology of the gland were normal; the occurrence of flushing also suggests a primary gonadal defect (Albright, 1936). It is unfortunate that the ovaries were so extensively destroyed by tuberculosis, but this infection was clearly of comparatively recent origin and could not have been responsible for the infantilism. There was no breast development with prolonged œstrogen therapy, though there was considerable growth of the uterus. A congenital defect in the response of mammary tissue may have been present, or, as recent work (Gardner 1940) has shown, the combined action of several hormones might have been more successful than œstrogens alone. One of Turner's cases showed some mammary development with œstrogens. Multiple pigmented moles were also present in Turner's first case, though no mention is made of them in the other cases.

Nomenclature is always difficult in describing new syndromes, but Turner clearly deserves the credit for recognising that the condition is not simply an isolated rarity. "Pterygo-nuchal infantilism" might be preferred to the hybrid "pterygium colli" of Funke. It would be interesting to know if the condition has ever been seen in males or, as appears to be the case at present, whether the infantilism is always linked with the female gonad.

SUMMARY

A case showing webbed neck, infantilism, cubitus valgus and pigmented moles is described.

Tests for deficiency of anterior pituitary function were negative.

Histology of the pituitary, thyroid and adrenal glands was normal; the ovaries were destroyed by extensive tuberculosis.

It is suggested that infantilism in such cases is due to a primary defect of the gonads.

I thank the Chief Medical Officer, London County Council, for permission to publish this case.

REFERENCES

Albright, F. (1936) *Endocrinology*, **20**, 24.
Bussière, J. A. (1902) *Ann. Hyg. Méd. colon.* **5**, 686.
Chandler, F. A. (1937) *Amer. J. Dis. Child.* **53**, 798.
Frawley, J. M. (1925) *Ibid*, **29**, 799.
Funke (1902) *Dtsch. Z. Chir.* **63**, 162.
Gardner, W. V. (1940) *Proc. Soc. exp. Biol., N.Y. Med.* **45**, 835.
Himsworth, H. (1939) *Lancet*, **2**, 1.
Kobylinski, O. (1883) *Arch. Anthrop.* **14**, 343.
MacCollum, D. W. (1938) *New Engl. Med.* **219**, 251.
Nageotte-Wilbouchewitch, M. (1934) *Bull. Soc. Pédiat. Paris*, **32**, 683.
Rechtman, A. M. and Horwitz, M. T. (1940) *Amer. J. Roentgenol.* **43**, 66.
Sharpey-Schafer, E. P. (1940) *Lancet*, **1**, 161.
— and Schrire, I. (1939a) *Quart. J. Med.* **8**, 195.
— — (1939b) *Clin. Sci.* **4**, 185.
Turner, H. H. (1938) *Endocrinology*, **23**, 566.

CEREBROSPINAL FEVER WITH LOW BLOOD-PRESSURE

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A CASE of cerebrospinal fever presenting features resembling the Waterhouse-Friderichsen syndrome has recently been treated here.

Multipara, aged 40, eight months pregnant. History of headache, generalised aches and pains, sore throat, rigors and vomiting, of sudden onset fifteen hours before. On admission temperature 100° F., pulse-rate 134, regular but of poor volume. Moderate neck-rigidity and positive Kernig and Brudzinski signs. Nervous system otherwise normal; heart and lungs normal. Systolic B.P. 65 mm. Hg. Moderately profuse petechial rash on trunk and limbs. Careful auscultation of abdomen failed to reveal fœtal heart-sounds. Lumbar puncture gave clear fluid under normal pressure containing 3 cells per c.cm.; no organisms were grown from it. Blood-culture negative, but meningococcal complement-fixation test positive. Serum-potassium 21·3 mg.; sodium 292 mg. and chlorides (as NaCl) 549 mg. per 100 c.cm. After several hours the patient's condition had much deteriorated; she was now pale, weak and mentally confused; tongue dry and glazed. Rash much more extensive, purpuric on trunk, with large plaques up to one inch square on buttocks and thighs.

Given sulphapyridine 9 g. and glucose-saline 4–6 pints daily by mouth; 10 c.cm. of Eucortone was given intramuscularly after admission, repeated twice daily on the two following days and once daily for two further days, a total of 70 c.cm.

Eight hours after admission patient went into labour and delivered a stillborn male infant, autopsy on which revealed hæmorrhages beneath the visceral pericardium and into the lungs. Brain, cerebrospinal fluid and suprarenals normal.

After twenty-four hours patient had improved slightly; rational at times, pulse slower and B.P. 90/50 mm. Hg. Left ophthalmoplegia and 7th nerve palsy had developed and there was severe headache. Further lumbar puncture, done two days after admission, yielded turbid fluid under pressure, containing 21,000 cells per c.cm. During next four days prostration and mental confusion passed off slowly, tongue became moist and clean and though chemotherapy was stopped owing to vomiting after 36 g. of sulphapyridine had been given, signs of meningitis cleared up with residual left facial paresis, and cerebrospinal fluid became clear. Pulse-rate dropped gradually to normal and systolic B.P. rose successively to 105, 115, 130 and finally 145 mm. Hg. On stopping eucortone systolic B.P. fell again to 125, and has fallen still lower during convalescence.

Puerperium uneventful, except for retention of urine necessitating catheterisation for a week after delivery. Rash faded completely on trunk in seven days but many purpuric plaques on buttocks and thighs broke down to form circular and oval ulcers which healed slowly and left extensive scarring. Otherwise recovery was complete and patient was discharged eight weeks after admission.

COMMENTARY

The unusual feature of this case was a persistent low blood-pressure with no signs of increased intracranial pressure or changes in the cerebrospinal fluid. The character of the rash and the satisfactory response to eucortone make it probable that some damage was present in the suprarenals. Most of the cases of Waterhouse-Friderichsen syndrome hitherto recorded were in infants and children under two years, and the extreme collapse and cyanosis of lips and extremities noted in them was not seen here; but these signs occurred in cases where massive hæmorrhages were found in both suprarenals post mortem, and were presumably due to a severe degree of circulatory failure, which was at no period well-marked in the present case.

Investigation of the sodium, chloride and potassium content of the serum, in which changes are found in the more chronic form of suprarenal deficiency, are not likely to be of decisive aid in diagnosis in a disease in which vomiting and dehydration are so common. The same applies to a low level of blood-sugar which has been suggested as favouring the diagnosis.

A clear cerebrospinal fluid with little or no rise in pressure or cell content and free of organisms is the rule

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in the Waterhouse-Friderichsen syndrome; but McLean and Caffey [1] have detected meningococci in smears of the petechiæ in 15 out of 18 cases of meningococcal bacteræmia with purpura, in 3 of which hæmorrhages were present in the suprarenals at autopsy. Examination of petechial smears was not done in the present case, the only evidence of the meningococcal origin of the disease being the positive complement-fixation test, but it appears to be the most reliable method of finding the organism. That the disease was meningococcal cannot be doubted, however, in view of the clinical picture, the late changes in the cerebrospinal fluid and the satisfactory response to sulphapyridine.

I wish to express my thanks to Dr. Allen Daley, chief medical officer, L.C.C., for permission to publish this case, and to Dr. E. H. R. Harries, medical superintendent of the North-Eastern Hospital, for advice and assistance.

POSTVACCINAL AND MEASLES ENCEPHALOMYELITIS

REPORT ON TWO CASES WHICH RECOVERED

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THE Ministry of Health reports for 1932–38 inclusive reveal only 6 cases (5 fatal) of postvaccinal encephalitis in infants under one year during this period in which Government lymph for 1,370,490 primary vaccinations was issued; 2 additional cases were notified during 1939. Encephalomyelitis is also a rare complication of measles, and Boenheim,[2] reviewing 5940 cases of measles, found nervous complications in only 0·4% of which less than a third were cases of encephalitis.

In the 125 reported cases of measles encephalomyelitis reviewed by Ford [3] the fatality was about 10%, and 65% of the survivors manifested residual symptoms; 8 of the cases occurred in one outbreak of measles in which some 55,000 people were affected. In the 1936 measles epidemic 8 cases of encephalomyelitis were under observation in the London infectious diseases hospitals, and 3 proved fatal. In view of the rarity of these conditions the following case-records may prove of interest.

CASE 1

Boy, only child, aged 6 months. Breast-fed for two months and subsequently bottle-fed on a well-known proprietary brand of dried milk with the addition of halibut-liver oil and orange juice. No previous severe illness, accident or operation. No recent or existing illness in household; brief association with contact of a case of influenza on Feb. 22. Convulsions when one day old but none since. Always pale and had of late been having iron tonic after feeds. Primarily vaccinated by single insertion on left arm on Feb. 14, 1940, full aseptic precautions being observed; 5 other children similarly primarily vaccinated about this time with same batch of lymph. Of these vaccinations, 4 were successful and none developed any signs or symptoms of disease of central nervous system in month subsequent to vaccination, during which were kept under close surveillance. Patient's parents had both been successfully vaccinated in infancy and mother successfully revaccinated in 1930.

Five days after vaccination patient's arm became normally inflamed with slight constitutional upset and continuous crying. On Feb. 21 high temperature and profuse perspiration. Next day squint noticed; disinclined to take bottle feeds though did not vomit. On 23rd profuse salivation developed, with right-sided spasmodic torticollis and elevation of right arm with flexion of forearm. Other limbs extremely limp; occasional spasms of jactitation of lower extremities. Later in day "clasp-knife" rigidity with spastic contraction of all muscle groups appeared. Child became very drowsy, apathetic and unresponsive, and uttered no sound. All these signs and symptoms became more pronounced within succeeding 24 hours and on evening of 24th child was admitted to Ilford Borough Isolation Hospital.

On admission temperature 99° F., pulse-rate 104. Respirations 26, varying considerably in depth and accompanied by occasional intermissions and deep sighing. General physique and nutrition good. Weight 14 lb. Lay on side with head retracted and slight opisthotonus. Waxy pale and completely comatose, with no reaction to handling. No abnormality detected in ears, throat, nose, lungs, heart, abdomen or urine, no rash and no signs of rickets or teething. Fontanelle tension slightly increased. Vaccination lesion looked normal and unbroken; surrounded by inflammatory zone ¼ in. wide; typical underlying deep induration. Sucking reflex weakly present but swallowing reflex had disappeared. Eyelids on both sides held tightly closed. Both eyeballs rotated downwards and left deviated inwards. Both pupils small, reacted to light, left slightly larger than right. No response to conjunctival or corneal stimulation. Owing to general spasticity tendon reflexes could not be obtained; abdominal reflexes absent, tâche cerebrale well-marked, and plantar reflexes both extensor. Kernig's sign positive. Priapism present.

Lumbar puncture gave clear fluid under low pressure with no excess of polymorphs or lymphocytes. Cells present included epithelial, a few endothelial, and a few red blood corpuscles. No organisms seen in direct smear; culture, sterile; no tubercle bacilli. Protein content 100 mg. per 100 c.cm. Sugar normal.

Some days later when the eschar separated from vaccination site area was swabbed and revealed a few degenerated polymorphs; hæmolytic *Staphylococcus albus* isolated on culture.

Treatment.—On Feb. 24 20 c.cm. of citrated blood from father given intramuscularly followed later by 20 c.cm. of citrated blood from a nurse vaccinated two months previously. Sulphapyridine soluble 0·75 c.cm. given intramuscularly every four hours for 6 doses, after which sulphapyridine 0·25 g. given four-hourly by mouth. On each of succeeding three days 20 c.cm. of citrated blood from the recently vaccinated nurse repeated and on evening of Feb. 27 sulphapyridine discontinued.

Progress.—On day after admission slight improvement; able to take small bottle feeds. On the 26th further improvement; temperature fell to normal, pulse-rate remaining at 124. Now able to take feeds normally and salivation had ceased. Colour paler and slightly cyanosed but coma now changing to stupor; when disturbed child made slight muscular efforts to resist and ineffectual efforts to cry. Only once produced any sound. Eyelids now held slightly open. No recognition of light or surroundings. Muscular contraction and rigidity and former signs remained unaltered, except for slight diminution in nuchal rigidity. On the 27th colour better; temperature and pulse now normal and thereafter remained so. Taking full feeds with avidity, crying frequently and evidently resenting being handled. Appeared to respond to sounds and some appreciation of bright light held close to eyes. Eyelids slightly more open and once eyes were fully opened voluntarily. Transient weakness of right facial muscles. Squint now intermittent. Muscular spasticity unchanged. Some blurring of outlines of right optic disc; left disc normal.

During succeeding week generalised rigidity slowly diminished, passive limb movements were more easily accomplished, cervical rigidity, opisthotonus, torticollis and priapism disappeared and active limb movements were attempted to limited degree. Ocular signs vanished and knee and ankle reflexes gradually returned, right being stronger than left. By March 14 the child was trying to lift head off pillow and sit up. Recovery subsequently continued uninterruptedly and by April 10, when discharged, no sign of spasticity and all reflexes normal. Had gained 21 lb. 5 oz. since admission on Feb. 24.

Three weeks after discharge was examined at Royal National Orthopædic Hospital by Mr. R. Y. Paton, who reported no signs of residual paralysis and all muscles gave normal electrical reactions.

CASE 2

Girl, aged 6 years. No previous severe illness, accident or operation. On March 1, 1941, developed cough and 14 days later rash of measles appeared. Disease pursued normal course until March 19 when aphonia developed and vacant facial expression was noticed. Remained fully conscious and able to express herself and indicate needs by gesture. Subsequently unable to speak despite strenuous efforts to do so. On March 22 was allowed to get up but could not stand without support or perform coördinated movements with hands and arms, which had become limp and tremulous. Saliva dribbled from mouth and stiffness and hyperæsthesia of legs were

1. McLean, S. and Caffey, J. *Amer. J. Dis. Child.* 1931, **42**, 1053.
2. Boenheim, F. *Ergebn. inn. Med. Kinderheilk.* 1925, **28**, 598.
3. Ford, F. R. *Bull. Johns Hopk. Hosp.* 1928, **43**, 140.

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noted. During next few days hands and arms increasingly rigid. Frequent attacks of crying on March 28. On 29th developed intense pain in legs and periodic screaming attacks between which lay stuporose.

Admitted to hospital on night of March 31 in stupor. Colour poor. Lay on side with slight opisthotonus. Temperature 99·4° F., pulse-rate 84. When examination was attempted became extremely violent and resistant, screaming with a husky voice of metallic timbre. Apart from slight congestion of fauces, physical signs limited to central nervous system. Pupils reacted to light and accommodation. Well-marked tremor of limbs with some rigidity; stiffness of spinal and neck muscles with slight opisthotonus. Kernig's sign weakly present on both sides; reflexes all somewhat exaggerated, with bilateral ankle-clonus. Lumbar puncture gave bloodstained fluid under normal pressure and on this and two subsequent occasions, 3 and 7 days later, examination report normal except for blood-cells accounted for by difficulty of controlling child during operation. During night of admission, erythematous rash appeared on arms and legs, with petechial spots on knees. By next morning temperature and pulse normal and remained so thereafter, but child excessively restless and violently resistant, with frequent attacks of screaming; required constant supervision and restraint to prevent her throwing herself out of bed. Head retraction, opisthotonus and limb tremor more definite. Later in day developed repetitive cycle: after throwing herself about and screaming for three minutes, during which arm and hand tremors, head retraction and opisthotonus were accentuated, had an interval of two to three minutes when lay quietly supine with outspread legs and arms, eyes and mouth wide open.

Treatment.—On admission put on fluid diet and given sulphapyridine 0·5 g. four-hourly by mouth, later augmented by sulphapyridine soluble 3 c.cm. intramuscularly. On April 2, 12 c.cm. citrated whole blood given intramuscularly and on 3rd, 4th and 5th 20, 20 and 10 c.cm. of measles convalescent serum given. Restlessness controlled by large doses of syrup of chloral and bromide.

Progress.—Slight improvement on April 4, when limb rigidity and tremors were less, opisthotonus and nuchal rigidity diminished and irritability not so extreme. Now appeared to be conscious and would follow moving object with eyes. Periodic attacks of screaming still occurred and still resentful of handling. Improvement was maintained and speech, at first limited to whispering with unnatural lisp, regained on April 6. Cerebration at first slow and irrational but improvement comparatively rapid and recovery uninterrupted and uneventful. Discharged on April 20. When re-examined on May 7 no signs of disease of central nervous system or evidence of mental impairment elicited. According to parents only abnormality was slight tendency to fidget, but speech clearer and more distinct than before illness.

DISCUSSION

While the use of blood or serum from recently vaccinated persons or measles convalescents is a well-recognised method of treatment in such cases, few examples of the successful administration of sulphanilamide or sulphapyridine are recorded. Although the value of sulphapyridine in virus infections generally is doubtful, it was felt that since it has been of benefit in certain diseases of virus origin, it should be employed in an attempt to augment the effect of serotherapy. It is interesting to note that Miller and Wray [4] have recently applied this principle to the treatment of poliomyelitis.

Since the fatality-rates in these cases vary considerably in different age-groups and in different recorded series, and spontaneous recovery does occur, it cannot be claimed that the favourable therapeutic response was achieved by the agents employed acting either singly or in combination. Nevertheless, in view of the extremely grave condition of the children, the first of whom was in an age-group for which the fatality is high, the extensive involvement of the central nervous system and the rapid progression of the disease process without any evidence of amelioration until treatment was instituted, some encouragement is given for the future employment of the method.

SUMMARY

A boy aged 6 months, with postvaccinal encephalitis, was treated with sulphapyridine plus intramuscular injection of blood from his father and from a recently vaccinated nurse.

A girl aged 6 years, with encephalitis following measles, was treated with sulphapyridine plus intramuscular whole blood and convalescent measles serum.

Both recovered completely.

4. Miller, S. and Wray, S. *Lancet*, 1941, **1**, 753.

ENCEPHALITIS OF UNKNOWN ORIGIN

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A SOLDIER, aged 19, belonged to a unit in which three other men developed typical zoster. The first reported sick on Nov. 30, 1940, the second on Dec. 20, 1940, and the third early in the New Year 1941. The patient enlisted on Dec. 19, 1940, received his first antitetanic injection on the 21st, his first T.A.B. injection on the 23rd and his second T.A.B. injection on Jan. 3. Twelve days later he felt ill, complained of nausea and headache, vomited once or twice and suffered from diarrhœa. On Jan. 17 he felt shivery and chilly, reported sick and was put to bed; his temperature was 103° F. Next day he had slight head-retraction and his headache was worse; a few herpetic lesions were noted and diagnosed as herpes labialis. On Jan. 19 he complained of slight breathlessness and his general condition aroused the suspicion that he might be developing pneumonia. He was therefore given 6 g. of sulphapyridine in 48 hours, and arrangements were made for his admission to hospital. There, no evidence of pneumonia could be found, but he had a little sputum which was sometimes blood-streaked. (He had had a slight cough with sputum for the previous month, and a sister had died of phthisis.) He was once more put on sulphapyridine as a precaution, receiving a further 7 g. in the next three days. On Jan. 21 he had a sudden transient impulsive outburst recorded as a "hysterical attack." Next day he was confused and restless, and was transferred to a military hospital.

On admission he was in a restless, delirious, very confused, out of touch with his surroundings, and resistant to all nursing and medical attention. There was slight neck-rigidity and a positive Kernig's sign; the optic discs showed a little haziness of the nasal margins; the cerebrospinal fluid was under moderate pressure and contained 7 lymphocytes per c.mm. Blood-count showed 18,000 leucocytes per c.mm. There was a fading crop of herpetic vesicles on the left side of his cheek. A further 7 g. of sulphapyridine was given between Jan. 25 and 28. He became more restless, requiring sedatives, and two areas of purpuric staining appeared over his right shoulder and sacrum. On the 27th he had a Jacksonian seizure, after which his condition changed to a quiet coma. On the 28th he had two further convulsions, and both plantar responses were extensor. He died on the 29th.

Autopsy.—No abnormality in dural or accessory sinuses. Membranes were rather pink and congested, and in left temporo-parietal region were adherent and manifestly inflamed over an area 2 in. square; apart from this they appeared somewhat bulky and œdematous. Cut surfaces of brain slightly pink; five areas of colliquative hæmorrhagic necrosis, two in one hemisphere and three in the other. These ranged from ½ to 2 in. across and were filled with a thin, purple liquid. Lieut. I. B. Gartside, R.A.M.C., reported on the sections as follows, and Prof. M. J. Stewart has kindly confirmed his findings.

"Several blocks of the brain tissue have been examined. Nowhere is there any suggestion of perivascular cuffing or of any other focal accumulation of inflammatory cells. There is some generalised œdema of the brain tissue, but this is not well marked. In all the blocks examined there is much focal and streaky hæmorrhage scattered throughout the tissue, in addition to the gross hæmorrhage seen by the naked eye. One large block, which shows relatively little change in the brain substance, shows a striking feature in the meningeal veins and vesicles lying in the sulcus which runs through the section, and in the capillary and venular channels in the substance of the brain itself. These are all distended with thrombus in which polymorphonuclear leucocytes are present in large numbers. (It will be remembered that there was a leucocytosis of 18,000.) This block also shows the same abundance of focal and streaky hæmorrhages, with some necrotic changes in the brain tissue in relation to these hæmorrhages, which is seen in all the blocks examined. A

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portion of the membranes which was adherent shows considerable engorgement with a good deal of interstitial hæmorrhage but little else of note. The chief pathological features are: the considerable focal and streaky hæmorrhage in addition to the five areas of gross hæmorrhage; the stuffing of vessels with thrombus in which the polymorphonuclear leucocytes are present in great numbers; and the entire absence of any focal accumulations of inflammatory cells or any perivascular cuffing."

DISCUSSION

The main points to be considered in this case appear to be: (1) that clinically he behaved as an encephalitis; (2) that herpes zoster was present in the unit; (3) that A.T.T. and T.A.B. were given more or less simultaneously just before the onset of the lesion; (4) the equivocal clinical observation of herpes on the lips accompanying the febrile onset of the illness; (5) that he had received sulphapyridine; and (6) the histopathological findings of a brain in which a toxic rather than an inflammatory reaction were the main features.

Russell Brain [1] has carefully reviewed the literature on zoster encephalitis, and although it is tempting to include this as such a case the autopsy findings are dissimilar and a physician who saw the patient at the time was satisfied that the herpes was herpes labialis. Nevertheless when seen in this hospital the fading vesicles extended well on to the cheek and angle of the jaw and were judged to be zoster. The administration of A.T.T. and T.A.B. simultaneously is known to be provocative of intense reactions and the onset of this case twelve days later shows a suspicious analogy to known cases of postvaccinal encephalitis as regards the latent period.

The actual type of response to virus infection seems to be of two varieties, according to Adler,[2] who has reviewed 100 consecutive cases diagnosed as acute encephalitis out of a total intake of 368,000 patients at the Boston City Hospital from 1929 to 1938. Only 70 of these satisfied her criteria for inclusion as unequivocally proven cases and in only 19 was an autopsy performed. The pathological findings demonstrated two clear entities—a toxic and a focal variety. The toxic variety was characterised by signs of diffuse cerebral involvement with a normal cerebrospinal fluid and perivascular hæmorrhages, but without focal leucocytic infiltration or demyelination. In the focal variety there were clinical signs of localised neurological lesions, with an abnormal spinal fluid and focal cellular infiltration and occasionally demyelination. The case here described seems to belong to the group of toxic encephalitis, and in an analysis of Adler's case material both types occur as postinfectious phenomena. These are her figures.

	Cases	Deaths
Postinfectious groups (following mumps, rubella, &c.)	30	13
Following exogenic poisons (alcohol, lead, &c.)	8	1
Infectious encephalitis (mastoiditis, typhus, &c.)	11	7
Acute lethargic	4	1
Other cases	17	5

The possibility that sulphapyridine may itself produce cerebral symptoms has been raised by Johnstone and Forgacs,[3] who observed that in some cases of cerebrospinal fever signs of cerebral irritation persisted or increased after the cerebrospinal fluid had become normal. Unfortunately no autopsy was done on their two fatal cases. In the present case there could be no question of overdosage, but according to Johnstone and Forgacs cerebral irritation may arise from moderate dosage of sulphapyridine. It seems, then, that this possibility cannot entirely be excluded here. Similarly it is not possible to exclude a toxic encephalitis, secondary to a mild pneumonia, though the autopsy gave no support to the clinical findings of pneumonia.

SUMMARY

A fatal case of toxic encephalitis is described in a man of 19. The lesion may have been secondary to a mild pneumonia, to zoster, to the injection of antitetanic serum and T.A.B. vaccine, or to sulphapyridine therapy.

1. Brain, W. R. *Brit. med. J.* 1931, **1**, 81; Schiff, C. I. and Brain, *Lancet*, 1930, **2**, 70.
2. Adler, A. *Arch. Neurol. Psychiat.* 1940, **44**, 541.
3. Johnstone, D. F. and Forgacs, P. *Brit. med. J.* 1941, **1**, 772.

Medical Societies

ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the Section of Medicine on Oct. 10, with Dr. A. R. PARSONS in the chair, an address on

Water Deficiency

was read by Dr. R. H. MICKS, the president of the section. He did not include the dehydration of surgical shock (without fluid loss) or the dehydration caused by extensive burns, for so much knowledge of these two subjects is now being acquired that it is too early to lay down systematic teaching. But it is important to try to arrive at a systematic teaching about dehydration due to diminished water intake or abnormal water-loss. The phenomena of water deficiency may, he said, be divided into three stages—first, those of the falling water-reserve, symptomless except for the loss of about a twentieth of the body-weight; second, those of dehydration without circulatory collapse, the symptoms of which are a dry tongue, loss of elasticity of the skin, hæmoconcentration, and beginning impairment of renal function; third, dehydration plus circulatory collapse. The aim must be to recognise the first stage, because the proper treatment of dehydration is to anticipate its onset, as can easily be done by careful measurement of the water balance, or, in the infant, frequent weighing. When dehydration is due to excessive loss of body fluids sodium chloride is as much needed as water. In dehydration plus circulatory collapse the intravenous route should be used, and at times hypertonic saline is required. In general the solution administered should be normal saline, but there is evidence that for rapid rectal absorption 0·12% saline is better. Glucose solutions are not necessary except when parenteral feeding has to be maintained for a long time, and sometimes in diabetic coma. There is little reason to think that either special alkalinising fluids or fluids containing calcium or potassium salts are useful, except possibly in certain rare cases. The intravenous route is really one only required in emergencies. In many cases fluid can be administered by mouth or nasal tube. Rectal drip is satisfactory in many cases and enough fluid can be given by that route to maintain life and compensate for a considerable abnormal loss. Intramuscular administration has been used successfully in some large clinics. Subcutaneous administration of large volumes of fluid is now but little practised, and Dr. Micks asked for the experiences of those who had used it. Intraperitoneal administration is, he thought, usually unsatisfactory because little fluid can be given.

Prof. W. R. FEARON wondered whether people drink enough water, and whether doctors are giving enough of it to their patients. Water deficiency is usually a question of salt deficiency and salt balance. If the cell membrane is complete the ions do not tend to escape readily from the cell. There is no mechanism equivalent to that of thirst to tell one when there is too much water in the body. If one knows the osmotic pressure of the urine one can draw the osmotic curve from hour to hour. This will show the state of water balance at any time. The treatment of dehydration is physiologically the administration of saline. Far more harm is likely to be done by giving too little water than too much.

Prof. W. J. E. JESSOP referred to the relationship of water to treatment with the sulphonamides. Water restriction in such cases is dangerous on account of the formation of drug crystals in the kidney.

Mr. SETON PRINGLE, president of the academy, said that surgeons recognised earlier than physicians the possibility of severe and perhaps fatal dehydration. In every major operation Arbuthnot Lane used to insert a needle under each breast and give two or three pints of saline. This was a great help in the first and second stage of dehydration, though it was quite useless in the third stage. Mr. Pringle had found saline without glucose satisfactory. Rectal drip has been the routine method for many years, but in many patients it proves uncomfortable and inconvenient. If serious dehydration is feared this method is tedious. A reservoir of saline is now used instead of the drip. This is connected with the

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rectum through a very wide tube and the saline is only taken up from the bag as it is needed, so that the rectum never becomes distended or uncomfortable.

Dr. GEOFFREY BEWLEY referred to the giving of nasal fluid to unconscious patients and said that in these cases it is frequently a case of giving food as well as fluid. The patients are given eggs and sugar by this route. Life can be preserved for months by giving fluid through the nose.

Prof. T. W. T. DILLON said that one of the most important things is to have some easy test by which to know when enough water has been given and the water depots are full. If the specific gravity of the urine is taken in these cases it will be observed that water repletion coincides with a sharp fall in the specific gravity.

Dr. R. E. STEEN said that there were certainly definite indications for the intravenous drip method in young children.

Mr. J. C. FLOOD said that until two years ago there was a tendency to give too much water. Patients were given transfusions of water under every condition of surgical collapse. It was then considered that this was being overdone. Of the importance of water in the right class of case there can be no doubt. It is necessary to distinguish between dehydration due to water going out of the body and that due to water coming out of the blood channels. There is a considerable chance of the patient being overdosed with water if he is suffering from straightforward shock associated with a water shift out of the blood-vessels into the tissues. There is no entirely satisfactory and reliable therapeutic test to show when enough water has been given. When a patient is receiving postoperative transfusions and salines a record must be kept of the total fluid intake and excretion every day.

Dr. A. W. SPAIN thought the intravenous route unsuitable for a doctor faced with an emergency away from a hospital. In such cases the subcutaneous route is very efficient. It is astonishing how rapidly a patient will absorb fluid if a pint is put under each breast. This can be done without causing the patient any inconvenience.

Reviews of Books

Surgery of the Heart

E. S. J. KING, M.S. Melb., D.Sc., F.R.C.S., F.R.A.C.S., major A.A.M.C.; honorary surgeon to out-patients, Royal Melbourne Hospital. London: Edward Arnold. Pp. 728. 50*s*.

VERSATILITY and thoroughness do not always go hand in hand, but here is an exception. During the past twenty years Major King's interests have ranged over surgery and pathology, from teeth in dermoid cysts to successful thoracic œsophagectomy for carcinoma; and now he succeeds in concentrating a vast and admirably documented quantity of information that bears on every phase and aspect of cardiac surgery. The book begins as it should with a clear, brief account of the heart's development, abnormalities, anatomy, physiology and pathology. Two welcome chapters explain orthodiagraphy, kymography, tomography, and finally, electrocardiograms, their shape and value. All the eggs—those war-time symbols of what is commonplace but unfamiliar—are thus in one convenient basket. Major King goes on to deal with experimental investigations, with the special surgical problems created by disease or injury of the heart or pericardium. The broad impression left is one of swift advance—encouraging, brilliant, tentative. Time must pass before we can choose, for example, with confidence the best surgical means of treating angina pectoris and the most suitable cases for treatment. Methods include those which seek to interrupt the conduction of pain and those—more numerous—aimed at removing the cause; the second group are designed to increase the vascularity of the myocardium, either by means of grafts of muscle and omentum, or else by opening up the rather grudging inosculation of cardiac vessels. This last method links up with the well-known work by Makins on simultaneous ligature of vein and artery; Blum and Gross have found that when the coronary sinus has been occluded, they can then, with the heart congested, tie a coronary artery at a point where ligation would otherwise cause death.

In discussing quasi-separate blood-supplies to the half-dozen layers of ventricular muscle the author argues that the fibrosis caused by infarction of one or other of these layers is likely to offer a barrier through which new vessels brought by a graft might be unable to grow. The fibrosed layer itself is often past salvation; and even if new vessels do penetrate compromised heart muscle, can we be sure that in *the living subject* there will be a flow through them towards the heart and not away from it? On these and many other points he brings his own investigations to bear. He suggests that too little attention is paid to the effect of merely opening the pericardium; for pain in some of his cases has been relieved before new vessels could possibly grow into the heart. Such relief is linked perhaps with the achievement of O'Shaughnessy and McCunn who managed to improve exercise tolerance in racing greyhounds by liberating their large hearts from pericardial restraint.

Satisfying indications for treating pulmonary emboli by operation are not yet even in sight; the surgeon must still wait till the red warning gives way to the green signal of death. And while it is certain that recuperable cases are being lost through an almost pandemic blight of unprepared defeatism, it is likely, too, that operation is often a superfluous coup-de-grâce. We shall be in much better position to judge of this and other cardiovascular procedures when we possess many more accounts of failures; Nyström wants careful records of them all. In the meantime we can study how to simplify, or even extend, the scope of intervention by removing clot with aspiration instead of forceps. Major King gives too little detail of operation for these emboli; he does not mention the screen of thick fat often found in front of the pericardium, a screen which may well confuse tyros, who are told to expect "a white and shining membrane" as soon as "the pleura is swept laterally." And "sweep," too, must be carefully qualified; the act needs no dash and plenty of method.

Cardiac-valve surgery is for the moment at a standstill in clinical practice; operation has only achieved success in 3 cases with mitral stenosis—Tuffier's in 1914, Cutler's in 1923, and Souttar's in 1925. In the first and last dilatation was made with a finger, while a tenotome was used in the other; and who knows how much of the improvement was due to the mere opening of pericardium? It would be improper to criticise a comprehensive, disciplined work on the score that the fascination of the subject is kept in abeyance, but we cannot help wishing the author had followed the practice of old writers and given us more loving detail (should one say the lowdown?), for example, on the toothpick found in the heart. Meanwhile he has produced for those concerned a quite indispensable book.

What Price Alcohol?

ROBERT S. CARROLL, M.D., medical director, Highland Hospital, Asheville, North Carolina. London: Macmillan and Co. Pp. 362. 12*s*. 6*d*.

Dr. Carroll certainly knows his alcoholists from infancy upwards and illuminates their progress through life by many a tell-tale case history. He appears however to indict alcohol for all degenerative trends in modern American civilisation, rather than to regard alcoholism as but one symptom of the neurotic's failure to face up to life's demands.

An interesting thesis, developed at length throughout the book, is that faulty diet is the fundamental defect in the average alcoholist. In the author's opinion the frequent restless gobbling down of everything from hot-dog to chocolate induces a "vitality-deficiency" and a "food-crave" which develop into a demand for the quicker satisfaction afforded by alcohol. He advances a "blood-brain-barrier theory," according to which the function of the choroid plexus is to filter off from the blood deleterious substances which would injure neurones and synapses if allowed to reach them. Products of hyperalimentation alter the permeability of the barrier and thus are indirectly responsible for dysfunction of the higher cerebral centres. Brain tracts of poor quality will be disorganised more easily than those of robuster heritage by barrier-passing toxins. Hence the distinction between those who can and those who cannot carry their liquor. On treatment Dr. Carroll's general advice is eminently sound: he keeps insistently before the patient the maxim: "You have come here to be taught to live without alcohol in any form at any time." He shows clearly that the attainment of this freedom involves nothing less than re-education of the addict personality.

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THE LANCET
LONDON: SATURDAY, NOVEMBER 8, 1941

THE WARD DRESSING

INFECTED war-wounds may be divided into two broad categories: first, wounds infected outside the hospital ward, and these are for the most part infections with the anaerobic sporing bacilli, *Clostridium tetani* and the gas-gangrene group; secondly, wounds infected inside the hospital ward where the principal pathogens are the pyogenic bacteria—staphylococcus and streptococcus and the coliform bacilli including proteus and pyocyaneus. These pyogenic organisms are found in only a small proportion of open wounds examined on admission to hospital—the figures have been 5–6% in the present war and 15–20% in the last—but after a week's stay in hospital the proportion of infected wounds may exceed 50% and increases with further residence to 70–90%. *Streptococcus pyogenes* is the most dangerous of the pyogens because of its great invasiveness, but the coagulase-positive staphylococcus, which in the past year has been the most frequent pathogen found in war-wounds, may also produce much chronic invalidity if it gets access to bone. It is true—and perhaps unfortunate—that infection produces little evidence of local or systemic upset in many wounds, particularly if they are shallow and draining well, and does not greatly retard healing, so that a complacent surgeon may regard such infection as innocuous. But once in a while an unfortunate "accident" occurs—a new patient develops cellulitis or septicæmia, signs of osteomyelitis appear in a case of compound fracture, nurses go off duty with septic fingers and sore throats, and the surgeon realises too late that infection is rampant in the ward.

It was to the problem of preventing these tragic consequences of wound-infection that certain teams of surgeons and bacteriologists in Hertfordshire addressed themselves during the past winter, and a direct result of their researches is an excellent memorandum,[1] published jointly by the War Wounds Committee of the M.R.C. and the Committee of Sector Pathologists with Dr. E. T. C. SPOONER as editor. In it the problem of hospital infection of wounds is clearly set forth and practical instructions are given for its prevention. If it be granted (and the circumstantial evidence is very strong) that pyogenic infection of open wounds takes place mostly in the hospital ward, the possible sources must be defined and controlled and the channels of spread blocked. The principal sources are wounds already infected, the air-passages of patients and ward personnel, and the dust of the ward which has become infected from the first two sources. The channels of spread are direct transference by hands, instruments and dressings which become bacterial carriers from contact with already infected wounds or respiratory tracts, droplet infection from the nose or mouth of attendant or patient (5–10% of adults are throat carriers of *Strep. pyogenes*; 30–40% are nasal carriers of *Staphylococcus aureus*), and air-currents carrying infected dust or droplet-nuclei. Obviously if the proportion of infected wounds increases, dust and air become more heavily infected, sore throats appear and a vicious circle sets in. In the infection of wounds, it seems probable, though the point has not been proven, that direct transference by infected hands or instruments is more important than droplet or aerial infection. The latter two channels can be largely blocked by efficient masking of all ward personnel plus the maintenance of silence among the patients and a still atmosphere during the period of the dressings. Bed-making, sweeping and dusting must be completed at least an hour before dressings are begun, windows and doors should be kept closed to minimise air-currents, floors may be treated with spindle-oil to adsorb the dust, and any movement of bedclothes must be done gently and slowly.

For the control of contact infection, a technique which for many will mean a radical revision in ward wound-dressing is recommended and described in detail in the memo. The key-points in this ritual are that the hands of the dresser are to be regarded as at all times infected, while the wound and the surrounding skin are to be likened to a plate of culture medium—that is, a surface very susceptible to infection and therefore to be uncovered for the shortest possible time, and, the memo might have added, as infrequently as possible. Gone are the days when wounds are gaily laid bare for the round of inspection by the big white chief and his retinue of maskless followers. Instead there is to be a dressing team, each member well versed in his or her own duties, and each wound must be inspected and re-dressed before the next is dealt with. The team consists of the dresser (preferably the house-surgeon), the trolley-attendant, a trained nurse who is responsible for the care and sterility of instruments, dressings, bowls and so on, and a "dirty" assistant to lend a helping hand in removing bandages or holding a limb, and to lift the lids of the bins for discarded dressings; all dressings are discarded but the bandages and outer dressings are salvaged for re-use. After the outer dressing has been removed by hand the inner dressing is changed by the dresser with long instrument forceps in hands that are washed and dried but not "scrubbed up." Every step is designed to prevent the transference of infective material from one wound to another by hands, instruments or dressings. For the sterilisation of instruments and the various receptacles—which should have lids—boiling in water in a ward-steriliser big enough to take the largest vessels is recommended; 2% soda should be added to prevent rusting, and scalpels may be so sterilised without detriment provided their blades are wrapped in lint or placed in a zinc rack. Once sterile, instruments can be kept in a dry sterile dish with a cover, or if this method is not convenient they should be immersed in liquor formaldehydi chirurgicalis[2] rather than lysol or spirit. Much practical instruction is given about the irrigation of wounds, chemical disinfectants, masks, sterilisation, and cleansing of baths, and particular attention is directed to the danger of cutting and changing plasters in the ward, for plasters usually teem with bacteria both inside and out. One of the most sensible suggestions is that nurses should have a short *practical* course in bacteriology which will bring home to them better than many abstruse lectures what infection means, a view which is borne out by Dr. JANET WELCH'S experience in Africa (see p. 574).

1. Prevention of "Hospital Infection" of Wounds. M.R.C. War Memo. No. 6. H.M. Stationery Office, 6d.

2. Borax 1·5, solution of formaldehyde 2·5, phenol 0·4, water to 100.

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Their intelligent coöperation, essential for success in countering cross-infection in wards, can only be obtained if the rationale of new procedures is explained to them, and a simple summarised version of this memorandum might well be made available to nurses.

If the recommendations in this pamphlet seem to some surgeons rather elaborate, with a smack of the laboratory about them, let them not on that account dismiss them as impracticable or unnecessary. Infection of open wounds is a menace to be constantly guarded against, and it is illogical to use a less strict technique in dressing these susceptible wounds in the ward than is used for less vulnerable tissues in the operating-theatre. That the new technique is both practicable and effective has lately been shown by McKissock, Wright and Miles,[3] who with it reduced the incidence of hospital infection in air-raid casualties from 31·3 to 2·2% in improvised E.M.S. wards. Local sulphonamide prophylaxis and other new methods may help to minimise hospital infection of wounds but there can be no gainsaying the soundness of the principles enounced in this memo, particularly for the dressing of open wounds. It should be read and digested by every surgeon, house-surgeon, hospital bacteriologist and surgical ward sister.

ABSENT FROM WORK

A decent craftsman, seen by his doctor on a Sunday afternoon, complained that he was dead to the world; he had been working for six days a week from 8 A.M. to 9 P.M. and on Sundays from 8 A.M. to 4 P.M.; he has had two days off in the past year. Another tired out labourer hopes he will not be sent to the docks for there they work 12-hour shifts seven days a week. An A.T.S. girl, coming home on 48 hours' leave, spends the first 36 hours of it sleeping. These are three relatively trifling examples of the fatigue which must be holding up production. The Ministry of Supply might take as their slogan "Too Long Hours mean Short Output," and every works manager should have it hung over his desk.

Unfortunately when hours are reduced the output does not rise immediately; there is a relatively long period of adaptation before the workers recover from fatigue and begin to improve their standards. Naturally the lag also operates in the reverse direction, so that an increase in hours will produce a greater output for the first few weeks—until fatigue sets in. This must be so; the human body cannot be switched straight into a different gear like a machine. These two equal and opposite lags make it difficult to convince the denser and more old-fashioned works managers that shortened hours will increase production; and so the damage goes on. Many of the workers themselves recognise the fallacy in long hours and take a day off when their fatigue becomes too great. Thus there are constant complaints of absenteeism in industry at a time when absenteeism can harm us all.

But fatigue, though the most important, is not the only thing which keeps people away from work. There is always more absenteeism among women than among men, and in war-time the increase in absenteeism among women is proportionately much greater. Some of the reasons for this appeared clearly in discussion at the second session of the Women's Parliament, reported in our issue of Nov. 1 (p. 537). The greatest increase is among married women who would not normally be working in factories. These still have their ordinary work to attend to: they must still keep the home clean, buy food for their families, cook it and clear it away. It might be supposed that when both partners were out at work both would share in domestic duties in the evening; but this does not seem to be so. Etiquette among manual workers enacts that a man cannot help in the home without being looked down on by his mates. This false pride has been found to be particularly prevalent in the north country where a man may help his wife by lighting a fire, but must not lend a hand in cleaning the house or washing up—the bulk of the housework. Even if the man is out of work and the woman is supporting the family his status must be preserved, and he cannot even do the household shopping without loss of prestige. Shopping nowadays is not a task which can be performed in a few odd minutes, so women take time off from the factory to do it—they have to. Absenteeism has been considerably reduced in factories which have added household goods to their canteens so that women can do their shopping during the lunch break. Even so, time must be borrowed to clean the house, give children their meals, or look after a husband home on leave. This piling up of tiring duties renders women more liable to breakdown than men, and illness is the second most important single cause of absenteeism among women. Travel difficulties increase fatigue for both sexes, as do nights made sleepless by raids or by civil defence duties. Sometimes raid damage adds heavy and dismal salvage work to the day's toil.

Unpunctuality and slowness in starting work cause nearly as much loss of output as absenteeism and it is noteworthy that many women prefer to stay away altogether than to clock in late, feeling that they might as well hang for a sheep as a lamb. This prejudice, foolish as it is, has to be taken into account. Many women and young people are without ambition and remain untempted by the thought of promotion or more pay. Moreover in many factories the workers—men and women alike—have little sense of sharing in the war effort; the idea that the Forces are depending on their work seems remote and unreal. This attitude is often coupled with the independent Englishman's belief that his boss "knows nowt" and is making a hopeless mess of things. This view, often mistaken, springs from ignorance of the problems to be overcome: and therein lies the kernel of this matter. In industry and local government there is too little give and take of information, too few committees on which workers and officers meet to exchange views and discuss policy. The discontent often found among those serving public bodies springs largely from the fact that they are treated as pawns and never consulted as reasoning people. The same applies in industry. Workers who are told the plans of their employers—who have the background of special demands explained to them and who understand not only what their factory is out to do but also what difficulties stand in the way of success—are anxious to help. Those who are treated like children and kept in the dark behave like children. This was well illustrated in the letter from a works manager which appeared lately in our pages (*Lancet*, Oct. 18, p. 471): three men were asked to do an

3. McKissock, W., Wright, J. and Miles, A. A. *Brit. med. J.* Sept. 13, 1941, p. 375.

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uncongenial job without being told the reason, so they went sick; as soon as they learned why they were needed they complied without hesitation. We are trying to get the best work out of a race of people who resent dictation; and we set about it by tiring them out and telling them nothing. We have the method, not the men and women, to blame for absenteeism.

MALARIA BROUGHT HOME

THE War Office pamphlet[1] on the treatment of malaria in people returning home from malarious areas is a timely reminder that we are likely to see many such cases during the next few years. Many people who contracted, or thought they contracted, malaria during the 1914–18 war are convinced that they still suffer from the disease. This is unlikely, for it seems that malignant tertian malaria rarely persists for more than a year or two after return from the endemic zone, although simple tertian and quartan malaria may on occasions last longer. There are exceptional cases, particularly of quartan infections, where the disease goes on giving trouble for long periods, but it is unwise to assume that any febrile disturbance in a person who has once had malaria is necessarily due to a relapse. The only way of establishing the diagnosis is by the recovery and recognition of malaria parasites; clinical examination alone is open to grave fallacy. Again, patients presenting a remarkable variety of symptoms and signs, quite unlike those of the classical malarial paroxysms, may be found to have pyrexia with parasites in the peripheral blood, and a few doses of an antimalarial drug will produce an astonishingly rapid alleviation of their trouble. When facilities do not exist for the microscopical diagnosis of the disease before treatment is begun, blood films should at least be made for later study. The so-called therapeutic diagnostic test may be gravely misleading, and should never be relied on. There is here one difficulty which constantly obtrudes itself in the study of this condition—the almost universal practice adopted by people who have lived in endemic areas of taking antimalarial drugs whenever they feel off-colour. A few doses of such drugs may well render the microscopist's task hopeless for the time being. In such cases there is little risk in stopping the drug and awaiting the reappearance of parasites in the peripheral blood before proceeding with systematic treatment. The diagnosis will then be established and treatment can at least be begun on a sound foundation.

Having established the diagnosis, the next step is to deal with the attack. The War Office pamphlet advocates the consecutive employment of three drugs: a salt of quinine by mouth in ten-grain doses thrice daily for two days; mepacrine hydrochloride (the British equivalent of Atebrin) by mouth in doses of 0·1 g. (1 tablet) thrice daily for five days; and finally, after a two-day interval, pamaquin (the British equivalent of Plasmoquine) in doses of 0·01 g. (1 tablet) thrice daily for a further five days. In this course the quinine salt is given first, since it is generally agreed that the action of quinine on the parasites, and thus on the clinical condition, is more rapid than that of any other available drug. The mepacrine sustains the therapeutic action and arrests the attack. Pamaquin, however, has little or no effect on the paroxysm but is given after this has been arrested, for when so given it is believed further to reduce the liability to subsequent relapse. This tendency to relapse is believed to be considerably greater after an attack has been treated by a single drug (either quinine or mepacrine) alone. In civil practice in this country there may be occasions when it is impracticable to follow this suggested course of treatment. One drawback is the necessity for keeping the patient in bed virtually throughout its duration—he should be confined there during and for some days after the pyrexia, and he should remain there during the exhibition of the pamaquin. Another may well be the expense and the lack of ready availability of mepacrine and pamaquin. A third is the possibility of toxic manifestations, especially liable to be caused by pamaquin. On such occasions there seems no reason why resort should not be had to the safe, cheap and universally procurable quinine preparations used in the treatment of innumerable cases in the past, and today still widely employed both here and elsewhere. It must be remembered that, particularly in the case of simple tertian and in quartan malaria, relapses do occur in many cases after a course of quinine alone, and possibly the relapse-rate is higher than that following a sequence of drugs, completed by a course of pamaquin; but this does not necessarily mean that quinine alone is not a most valuable drug. A method of treatment with quinine is suggested in the pamphlet, but another much employed consists of the oral administration of ten-grain doses of quinine sulphate in acid solution (Ac. sulph. dil. ℥xv in a tablespoon of water) thrice daily for three or four consecutive days. This will arrest almost any attack of malaria and clear the parasites from the peripheral blood of nearly every case. If this course is followed by the administration of the drug in similar doses on two consecutive days each week for a couple of months most early cases of malignant tertian malaria will not relapse. Such, unfortunately, cannot be said of simple tertian and quartan cases. Where relapses do occur in these the course can be repeated. Advantages of quinine are that it is effective in producing rapid clinical cure of the acute attacks, and that when this has been achieved the patient can continue with his ordinary vocation throughout the remainder of the course. At present many seamen on merchant and other vessels are being treated on these lines, and the period of their disability ashore is thus reduced to a few days. They can then return to sea, provided they continue to take the drug as directed. Many claim to be unable to take quinine; but in fact nearly everyone can do so, in the doses recommended, without any symptoms except temporary deafness and tinnitus.

The observations in the pamphlet on the intravenous and intramuscular injection of quinine deserve particular attention. Their routine and repeated use is rightly condemned; and due care must be exercised when using the intramuscular route to avoid periosteum and bone, large nerves and vessels, if disastrous results are not to follow. Intravenous quinine is potentially dangerous and should be given only in carefully selected cases and with extreme caution. The type of case requiring parenteral administration is the one in which the drug either cannot be taken or retained by mouth, or in which

1. Notes on the Treatment of Malaria occurring in Individuals returning from Service in Malarious Areas. H.M. Stationery Office. 1941. Pp. 6. 1d.

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it is unlikely to be absorbed readily on account of the grave condition of the patient. Such cases are usually due to a malignant tertian infection, where speed in diagnosis and treatment is essential to lessen the risk of an early fatal issue.

WHEN TO TIE THE CORD

UP to a few years ago there was no difference of opinion about when the umbilical cord should be obliterated and the vascular connexion between mother and infant severed. The standard textbooks usually said "when the cord has ceased pulsating," and this was an easy rule to follow. The first element of doubt crept in as BARCROFT began to publish the results of his fascinating studies on the respiration of the fœtus and newborn baby. It seemed to be a legitimate practical deduction that once the infant's head was clear of the vulva and the respiratory tract was wiped clean of mucus in its upper reaches the sooner the cord was clamped the better, since this ensured the cutting off of oxygen which BARCROFT had shown was the most important stimulus for the first inspiration. So some obstetricians and their pædiatric associates began to urge that the cord should be clamped earlier than hitherto, the pædiatricians adding that since the infant spent the early days of life getting rid of his fœtal polycythæmia there was no harm in preventing the placental apparatus passing over the last few teaspoonfuls of blood. One pædiatrician, asserting that too much blood in the veins (hyperphlebæmia) was the cause of many troubles in infancy and childhood, urged that after the cord was cut some bleeding from the infant's end should be encouraged.

Now certain workers in Chicago are claiming that deprivation of placental blood may be a cause of iron deficiency in infants. According to E. E. WILSON, W. F. WINDLE and H. L. ALT,[1] when the umbilical cord is clamped immediately after birth, over 100 c.cm. of blood can usually be obtained from its placental end. They argue that this is equivalent to about a third of the blood-volume of the newborn infant, and that the iron liberated from the blood normally destroyed in the early days of life is stored and used for hæmoglobin formation in later infancy. If this is so the deprivation of a third of the blood-volume at birth may be a serious threat to the composition of the blood in the second half of the first year of life. Arithmetic is then brought in to suggest that deprivation of placental blood means that at 6 months of age the infant's quantum of hæmoglobin will be 9·1 g. instead of 12 g. per 100 c.cm. and at 9 months of age 9·7 g. instead of 12 g. per 100 c.cm. In order to test the validity of this theory studies were made in a series of infants aged 8–10 months. In 15 of these infants the cord had been clamped immediately after birth and in 13 clamping had been delayed "until the placenta had begun to descend into the vagina." For the former group the average blood values were: red corpuscles 5,060,000 per c.mm., hæmoglobin 10·8 g. per 100 c.cm. and mean corpuscular hæmoglobin 21·8 $\mu\mu$g. For the second group the corresponding figures were 4,450,000 per c.mm., 11·9 g. per 100 c.cm. and 27 $\mu\mu$g. It is claimed that, although the differences in the average erythrocyte counts and hæmoglobin values for the two groups are not highly significant in themselves, the difference between the mean corpuscular hæmoglobin in the two groups is statistically significant and it is considered that the infants in the "immediate clamping" group showed evidence of a mild iron-deficiency anæmia.

All the infants investigated, however, came from families of a low income group and although nearly all were receiving some carrots, spinach and other green vegetables it would not be unreasonable to suppose that additional iron, as advocated by some experts for all infants, would readily abolish the slight difference between the two groups. As regards a possible anæmia in later infancy the idea of leaving the cord until the placenta has begun to descend into the vagina cannot then be said to be strongly supported. What may be called the Barcroft point of view seems to have better claims. Further work is still needed to decide whether any change is necessary in the standard midwifery teaching of tying the cord as soon as pulsation ceases.

1. *Amer. J. Dis. Child.* 1941, **62**, 320.

Annotations

SALT WATER SURGEONS

How old is the profession of ship's doctor? Perhaps as old as the ark, if Shem, Ham and Japheth founded that precedent by which three sons distribute themselves between the church, the law and medicine. But striding down a century or two we find the calling well established in the days of Augustus Cæsar; and Surgeon-Commander R. S. Allison, at the opening of the winter session of the Royal Victoria Hospital, Belfast, suggested that St. Luke himself may have been a ship's doctor. In English ships the surgeon had a precarious status, but by the reign of Henry VIII—a monarch justly celebrated for uniting surgeons and barbers—they were doing rather well, the "chief sirurgyon" getting a salary of 13*s.* 4*d.* a month. Queen Elizabeth chose William Gilbert, one of her own physicians and president of the College, to help to stem the increase of disease in her navy; and John Woodall, first surgeon general to East India Company, followed "Generall" Lancaster in recommending lemon juice as a cure for scurvy 180 years before its use became general. Woodall also wrote a textbook for ship's surgeons which became a classic, noteworthy no less for its therapy than its piety. In the seventeenth and eighteenth centuries the status of ship's surgeons was still in the balance. They were not commissioned officers and their pay and quarters were equally poor. Many of them were keen and devoted, striving against disease in their ships' companies. Commander Allison recalled Smollett's grim account (in "Roderick Random") of his experiences, and quoted the vivid picture drawn by William Cockburn in 1697 of the ravages of typhus. He also mentioned Richard Walter, who described how severe scurvy could dissolve the callus of a well-healed fracture and leave it disunited; and Lind and Anson, who found that "the number of seamen in time of war who die of shipwreck, capture, famine, fire and sword are inconsiderable in respect of such as are destroyed by the sea diseases." Another eighteenth century sea-surgeon, Thomas Trotter, fought well for his sailors, demanding from the Lords of the Admiralty not only the fresh fruits and vegetables which would clear their fleets of scurvy but other amenities. "Give your tars," said he, "Oh my countrymen, their amusements; and while you enjoy yours on shore remember who they are that gave you security." And how strange that Dover's powder—that symbol of drowsiness and gentle perspiration—should be the nostrum of a pirate who was presumably his own ship's doctor: Thomas Dover, physician and privateer, the

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rescuer of Alexander Selkirk. Then there was Robert Younge, who left a record of the battle of Camperdown in 1797, when his ship H.M.S. *Ardent* lost 41 killed and 107 wounded out of a company of 485, and he was operating for fifteen hours non-stop. Perhaps the most famous of the old naval surgeons was Sir William Beatty, who became friend and surgeon to Nelson; to him we owe an account of those closing scenes on the *Victory*, of Nelson's wounds and end. And he tells how the body was brought home to England steeped in brandy, and of the post-mortem findings. Commander Allison ended his tales of the sea with another quotation from Thomas Trotter:

"As study and diligence lead to preferment in every department of life, so in our line they have their rewards. We fulfil a most important station in the service of our country; nay of much more importance than we can expect credit for, because many of our best actions must sleep with ourselves, as medical abilities are not to be appreciated by common observers. Yet, this very circumstance is a stimulus to exertion; for it keeps alive the spirit of perseverance, from the hope that merit will at last be discerned and meet with success."

LOCAL ANÆSTHESIA IN DELIVERY

THE British mind has never accepted local infiltration anæsthesia as the method of choice in pelvic delivery. This reluctance has been explained by several arguments—that most obstetricians prefer a generally anæsthetised patient, since thereby their time is saved and any major procedure required is immediately feasible; that few institutions or chemists can be relied on properly to prepare a reliable local anæsthetic that is safe and certain in its results; that the locally anæsthetised patient requires more supervision than her unconscious sister. But the most likely explanation is that the average practitioner does not understand the local nerve-supply of this area of operation since he has never fully studied it from the point of view of infiltrating the nerve paths involved. These arguments, even if valid, are readily overcome. First, as Sheldon [1] insists, it is essential to appreciate the anatomy of the female perinæum and genitalia. The nerve-supply that must be blocked is a threefold one. The pudic nerve leaves the pelvis through the greater sacrosciatic foramen and joins the pudic vessels in Alcock's canal; it then divides into the perinæal nerve and the dorsal nerve of the clitoris. The inferior hæmorrhoidal nerve branches off the pudic trunk before its terminal division. These nerves traverse the ischiorectal fossa and supply the skin of the perinæum, labia minora, a large part of the vagina and part of the labia majora and anus. The second important nerve is the small sciatic; this emerges from the pelvis through the great sacrosciatic foramen and supplies the skin of the perinæum and back of the thigh and leg. It gives off the inferior pudendal nerve, which curves forward from below the tuberosity of the ischium to supply the skin of the labia, communicating with the superficial perinæal and inferior hæmorrhoidal branches of the pudic nerve. The third nerve that must be blocked is the ilioinguinal, which emerges from the external abdominal ring to supply the skin of the upper and inner part of the thigh and the skin of the labia. To infiltrate these nerves three points are chosen: the first over the external abdominal ring, the second just medial to the tuberosity of the ischium, and the third in the middle of the perinæal body. From these points a fan-shaped area is infiltrated spreading towards the vagina. About 10 c.cm. of 1% procaine is used for each point, amounting to 50–70 c.cm. in all. Ideally the procaine solution should be freshly prepared and sterilised by autoclaving at 5 lb. pressure for five minutes; it should be made with sterile normal saline. The addition of 10 minims of 1 in 1000 adrenaline to every 100 c.cm. of solution prolongs the anæsthetic effect and has a small but valuable local hæmostatic action. An ordinary Record syringe and a long fine needle are the only other essentials. To get the best results the timing of the injection is important. The first stage is conducted along the usual lines using Omnopon and scopolamine or gas-and-air analgesia. In a primipara the time for infiltration is when the baby's head is on the pelvic floor, but in a multipara as soon as the os is fully dilated. The period of anæsthesia to be expected varies from 1 to 2 hours, and this should suffice in all normal cases. The extent of the anæsthesia is sufficient for the performance of an episiotomy or for the application of the low forceps and the suturing of perinæal tears. There are certain practical considerations that recommend the method. The patient being conscious can be enlisted to coöperate in bearing down efforts as required. She avoids the risk of an inhalation anæsthesia, while the operator has all the muscular relaxation of the outlet such as only a deep general anæsthetic could otherwise provide, thus minimising the likelihood of forceps delivery, episiotomy and laceration. Shock and blood loss are minimal since the uterine tone is not in any way prejudiced by the atonic effects of a general anæsthetic and the chances of an atonic postpartum hæmorrhage are avoided. The benefits to the baby are self-evident; the baby is no more affected than if the delivery had been conducted without any anæsthetic at all and no respiratory depression from inhalation anæsthesia is seen, with a resulting minimum of cases of asphyxia. Sheldon has used this method in 64 cases and finds it eminently satisfactory. It fulfils the ideals of any anæsthetic to be used in obstetrics and its safety for both mother and baby recommend its wider trial.

1. *New Engl. J. Med.* March 6, 1941. p. 404.

STUDENT AND SCREEN

THE sound film "Malaria" was shown on Oct. 30 by the Ross Institute of the London School of Hygiene and Tropical Medicine. This film, made by the Shell Film Unit in collaboration with the institute, and produced by Arthur Elton and Graham Tharp, is a beautiful piece of work. The immense problem of malaria is stated, the life-history of the parasite is exposed, and finally the watcher is shown how this knowledge can be used as a rational basis for a campaign of preventive medicine on a wide scale. The photography is arresting. Different places where mosquitoes breed are shown as in a travel film; diagrams by Francis Rodker are particularly clear, and the complicated life-cycle of the parasite is demonstrated by excellent microphotographs, the work of Percy Smith and Sidney Beadle.

Such a brilliant presentment of technical material demonstrates the use which could and should be made of the cinema in medical education. Although there are now quite a number of scientific films, most have a limited audience and few are shown to students. In the days before printing, education depended on lectures and readings from rare manuscript books. Printing gave every student access to textbooks and saved him the labour of copying. Lectures continued, nevertheless, to be the basis of education, and attendance at them is still compulsory in some universities, though it would be equally logical to compel the student to read Professor X's book before being allowed to sit for an exam. As the technique of illustrating was perfected, photographs began to invade the pages of the textbooks and the student's eye could feast on static delineations of cells, tissues and organs which in life are never at rest. The cinema film, the ultra-rapid camera and the microscope can be used to convey clearly to every member of an audience the details of almost any biological process; yet academic circles in England have hardly noticed this new weapon. The sound film can combine the best, and most carefully prepared, lecture with the exact demonstration of phenomena. Colour, magnification, speeding up or slowing down, can be used to reveal inaccessible processes larger than life and twice as natural.

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Even the work-shy student, with ears like the deaf adder's for the lecturer's drone and eyes revolted by the sight of type, might be stimulated by cinematic tuition. Young men and maidens have been known to cut lectures; they seldom miss the flicks.

The movie has one priceless perquisite. Time is no object: a thousand years is as a day, and a day as a thousand years, just a function of the speed of the clockwork. Fifty years ago Muybridge's slow-motion pictures taught us how we run and jump; the name of Canti stands for the quick-motion solution of the solemn process of tissue culture. The film is not just an adjuvant to the news story, it is the only way of bringing home the rhythm of life.

THE BOOKS GO ROUND

THE International Guild of Hospital Librarians is not to be put off by a mere blitz. Some hospitals have lost the better part of their libraries along with much else; others have been more fortunate. *Book Trolley* for October tells of volumes repaired, librarians appointed, patients giving a capable hand, and service steadily maintained. There are stories of resource, too—of the librarian who met the needs of two Polish airmen with seven Polish books and a dictionary, and trained a one-author man (the author was Nat Gould) to nibble at Zane Grey and then by gradual degrees to swallow most of John Buchan and a stiff dose of Cronin. This reading habit grows on us with war.

Nor are the troops forgotten. The Red Cross and St. John Hospital Library has been developing into a vigorous and widespread service since the war began. Bales of books are being sent out regularly to the depots and hospitals in the Middle East, Kenya, Iraq, Iceland, West Africa and Gibraltar, as well as the sick quarters of the Navy and R.A.F. During the summer books and magazines have been sent out at home and abroad at the rate of more than twenty thousand a month. The books which come in from donors have to be sifted, for many people anxious to be of service have sent along all manner of books, regardless of aptness for the purpose. Thus "A Treatise on Elephants" has been known to arrive cheek by jowl with "Better Bed Manners." At home war has made for useful decentralisation; book depots have been established in every county of England and Wales and in many provincial cities. They collect and distribute, sort and mend books. Voluntary librarians sometimes helped by professionals have been appointed who have been able to meet the needs of patients methodically, thanks to the experience gained in the library service during the past twenty years.

TUBERCULOSIS IN DUBLIN CHILDREN

THE tuberculosis mortality of the child population of Dublin City for the years 1930–36 was 8 per 10,000 children in the age-groups 0–15, and for 1937–39, 7 per 10,000. These figures led the Irish Pædiatric Association to make a tuberculin survey in the hospitals of the city and a report compiled by Dr. Dorothy Price has now been issued.[1] Six hospitals participated in the survey, and the tuberculin test employed throughout the investigation was the Hamburger percutaneous ointment. The association are well satisfied with this as an initial test, finding it reliable, simple and painless. A group of 1121 children were tested in the age-groups 0–14, of whom 230 reacted. The reactors at all ages were thus 20·5% of the total tested, the percentage increasing from 4·6 in the 0–1 year group to 46·1 in the 10–14 year group. Sex-incidence showed a slight preponderance of female positive reactors (4%). No less than 22 unsuspected cases of active tuberculosis were diagnosed by means of the test. The radiological findings in 116 of the children with positive reactions showed that 67 were suffering from active lesions which required treatment; 6 died. Physical examination of the lungs gave very misleading results; primary pulmonary infection could not be diagnosed by stethoscopy, and tuberculous could not be distinguished from non-tuberculous pneumonia. As a general rule a high erythrocyte-sedimentation rate was found to indicate an exudative lesion, whereas a low one pointed either to a healing lesion or to a caseous or advanced tuberculous focus with bad prognosis. An analysis of the source of infection in 38 cases, most of them under 5, showed that the father was the source of infection in 12 and the mother in 9. In attempting to correlate the housing conditions with the incidence of tuberculosis it was noted that the tuberculinisation of the childhood community appeared to be evenly distributed among all classes of dwelling, but that the slum child had much greater difficulty in healing his tuberculous lesion. The word "slum" is used in the report to indicate "one room in a tenement house, basement, or dilapidated cottage." The report tabulates a number of possible measures for meeting the situation. Excluding as impracticable the removal of a child exposed to infection under some sort of Grancher system, or the removal of the infecting adult by compulsory segregation, Dr. Price considers that the best method of prevention is early diagnosis, combined with prophylactic vaccination, increased institutional accommodation, and educational propaganda.

1. *Irish J. med. Sci.* July, 1941, p. 241.

PNEUMOCOCCAL MENINGITIS

ALTHOUGH pneumococcal meningitis is comparatively rare—only 7% of Neal's[1] 3131 collected cases of acute and chronic meningitis were pneumococcal—it was until the introduction of the sulphonamides almost invariably fatal. Perhaps more often secondary than primary, with otitis media and pneumonia the commonest primary infections, pneumococcal meningitis affects young children and elderly people more than it does other age-groups, having in this respect some resemblance to bronchopneumonia. While any one of the 30-odd pneumococcus types may be the infecting agent, type III pneumococcus is the most common single type in this infection and is particularly associated with meningitis in older patients as a sequel to an insidious otitis media or mastoiditis. Since sulphanilamide is effective against this type, determination of the pneumococcus type in meningitis is probably always worth while, for some patients do not easily tolerate sulphapyridine. Indeed the good results obtained with sulphanilamide in the treatment of pneumococcal meningitis (including types other than type III) have prompted Steele and Gottlieb[2] in a recent review to rank it alongside sulphapyridine, which besides being more toxic is less uniformly absorbed. Howard[3] in his report of the recovery of a child aged 1 year—a very rare occurrence at this age even in these sulphonamide days—suggests that sulphathiazole is the drug of choice. If so, it must be given at regular four-hourly intervals for its rapid excretion makes a constant concentration in the tissues difficult to maintain. No-one will now deny that all three of these sulphonamides can miraculously save patients with pneumococcal meningitis, but it is not easy to say what proportion of treated cases do actually recover, for it is inevitable that successes will be published more often than failures, and an analysis of the published cases is not a fair criterion of the case-fatality under sulphonamide therapy. This point is exemplified in the series of 14 cases with only one recovery recorded by Cooke.[4] It will be noted that of his fourteen cases nine were over 45 years of age and two under 2 years which from the prognostic viewpoint are the unfavourable age-groups with sulphonamide therapy: the recovered patient was aged 22. Apart from age, probably the most important

1. Neal, J. B. *J. Amer. med. Ass.* 1935, **105**, 568.
2. Steele, C. A. and Gottlieb, J. *Arch. intern. Med.* 1941, **68**, 211.
3. Howard, S. J. *Lancet*, Nov. 1, 1941, p. 512.
4. Cooke, W. T. *Ibid*, p. 510.

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factor in recovery is early institution of chemotherapy. The drug should be given at the first suggestion of meningeal symptoms even though this means treating cases of meningismus, and the initial doses should be large enough to ensure an adequate concentration as early as possible; Steele and Gottlieb suggest a cerebrospinal fluid level of 10 mg. per 100 c.cm. for sulphanilamide and 5 mg. per 100 c.cm. for sulphapyridine. Improvement should be evident within 2–3 days, but the drug should not be discontinued too soon, lest there be a relapse of the infection. As always with sulphapyridine or sulphathiazole, as much fluid as possible should be given in order to avoid deposition of the drug in the urinary tract. Surgical treatment is needed where there is middle-ear or mastoid disease, and these cases usually do well. Opinion is divided on the need for or value of adjuvant serum-treatment, but there is no conclusive evidence that it contributes to recovery.

ESTIMATION OF SULPHONAMIDES IN THE BLOOD

IT is neither necessary nor practicable to estimate the amount of sulphanilamide or its derivatives in the blood of every patient receiving one of these drugs. Apart from research there are occasions when the determination is helpful—for example, in the treatment of pneumococcal meningitis or to make sure that the drug is being adequately absorbed when an infection fails to respond to treatment. Various methods have been elaborated for the determination; they usually depend on preliminary diazotisation of the sulphonamide followed by conjugation with an aromatic amine. Sheftel[1] has described a bedside micro modification of Marshall's method. Conjugation is effected with N(1-naphthyl)-ethylenediamine dihydrochloride, all the reagents being added in the form of tablets to the blood diluted with water, the final colour being compared with a lucite wedge in a special colorimeter. Sheftel uses the same wedge for estimating sulphanilamide, sulphapyridine and sulphathiazole and does not mention the difficulties of comparison due to differences in the colours given by the three compounds. As a bedside method the results should be adequate and the principal objection to the method seems to be the necessity for a special colorimeter. Scott[2] discusses a simplification of the macroscopic laboratory methods which employ dimethyl-α-naphthylamine. His method as applied to blood-plasma should avoid the errors arising from adsorption of sulphonamide on the protein, an error which various observers have shown to amount to 5 or 10%. Scott describes the application of the method to whole blood, and while this is less satisfactory there are occasions when, because of hæmolysis or because only a small amount of blood can be obtained, plasma cannot be used.

CUCUMBER SEEDS AND CLINICAL MEDICINE

A MATERIAL advance in knowledge often follows an improvement in the technique of assay. But some of the newer methods involve the use of biological reagents which seem, to those not hardened to it by experience, to be bizarre and much too fantastic to be of use to ordinary men. Some of the more exotic methods for the biological assay of the sex hormones may be recalled in this connexion. It may even seem rather a far cry to many clinicians from cucumber seeds to scurvy, but, nevertheless, there is a connexion, and it is really a simple and logical one. Cucumber seeds contain a very active enzyme which oxidises ascorbic acid. Meiklejohn and Stewart[3] have taken advantage of this fact to elaborate what promises to be an elegant method for the determination of the antiscorbutic vitamin. The principle may be compared with the one, more familiar to medical men, of using an enzyme from the Jack, or Soya bean, to determine the amount of urea in blood or urine. The great advantage of Meikeljohn and Stewart's method over the older ones for estimating the amount of ascorbic acid in, let us say, urine, is the specificity which it introduces into the assay. Nothing but ascorbic acid will react, which is far from being the case with the older methods. As described, the method is naturally a little more complicated than the older ones, but it involves no elaborate apparatus and its manipulation ought to be relatively simple. Incidentally, in the course of their research, Meiklejohn and Stewart have made a pretty little contribution to pure science, by showing that the enzyme which oxidises ascorbic acid is a copper protein compound. It must give them considerable intellectual satisfaction, in these days of death, to think that they have been instrumental in discovering one of the biological functions of copper, and demonstrating one of the reasons why minute quantities of it seem to be essential to life.

1. Sheftel, A. G. *J. Amer. med. Ass.* 1941, **117**, 439.
2. Scott, L. D. *Brit. J. exp. Path.* August, 1941, p. 220.
3. Meiklejohn, G. T. and Stewart, C. P. *Biochem. J.* 1941, **35**, 755, 761.

TUBERCULOUS RHEUMATISM

THE forty years that have elapsed since Poncet[1] introduced the concept of "tuberculous toxic polyarthritis" have seen much argument as to whether the syndrome exists, but relatively little fact that was either relevant to the issue or incontrovertible. The extensive review covering 240 references by Brav and Hench[2] in 1934 concluded that evidence on which to base the concept was lacking. Copeman[3] in this country was able to find only 12 case-records in the literature; typical tubercles were found in one out of four biopsies. Proof that the syndrome is distinct both from rheumatoid arthritis in a patient with tuberculosis and from tuberculosis affecting several joints (which it occasionally does) must depend on the demonstration of a histological appearance differing from either. Kling and Levine[4] have now published a full and carefully documented account of one such supposed case, with a previous history of "open" tuberculosis, an arthritis thought to be of rheumatoid type in the left knee, and fleeting pains in various other joints. European observers diagnosed Poncet-type rheumatism. A synovectomy revealed, histologically, fibrotic tubercles and caseation with a few acid-fast bacilli, a positive culture and positive animal inoculation. The conclusion reached is that a mild type of tuberculous polyarthritis does occur, due to hæmatogenous infection from a visceral focus associated with high tissue resistance. The use of Poncet's term "rhumatisme tuberculeux" should be avoided, for it leads only to confusion; the diagnosis made should be either "rheumatoid arthritis" or "non-destructive tuberculous arthritis." In this country we seldom diagnose "tuberculous rheumatism," but it seems possible that some cases of this nature are masquerading as "atypical, or monarticular, rheumatoid arthritis" to the detriment of the patient and the public. The failure of aspiration to give confirmation in proved cases of tuberculous arthritis points to biopsy as the only certain and incontrovertible proof. This should, in selected cases, be more often practised.

1. Poncet, A. *Lyon Méd.* 1902, **99**, 65.
2. Brav, E. A. and Hench, P. S. *J. Bone Jt Surg.* 1934, **16**, 839.
3. Copeman, W. S. C. *Rep. chron. rheum. Dis.* 1936, **2**, 24.
4. Kling, D. H. and Levine, M. A. *Arch. Surg.* 1941, **42**, 956.

Surgeon Rear-Admiral G. GORDON-TAYLOR, F.R.C.S., has arrived in Boston to attend the clinical congress of the American College of Surgeons as a representative of the Royal Navy and the Royal College of Surgeons of England.

The Minister of Health has asked that tuberculosis notifications from county councils, county borough councils, urban and rural district councils and joint tuberculosis boards shall reach his department not later than six days after the end of the four-weekly periods to which the returns relate.

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Special Articles

JUVENILE DELINQUENCY IN WAR-TIME

REPORT FROM THE BRISTOL CHILD-GUIDANCE CLINIC

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AN analysis has been made of the cases referred by magistrates and probation officers to the Bristol child-guidance clinic during the past two years. These cases constitute approximately a third of all the children actually charged, and these delinquents in their turn represent only a small proportion of the socially unsatisfactory and incompetent group in the population. It is however a significant proportion, since it is obviously constituted by those whose degree of incompetence is sufficiently serious to prevent their making a satisfactory social adjustment without some special provision for training.

The period April, 1939–40, can be taken as an example of a peace-time era, because the war, as far as this country was concerned, was then in a latent state. The period April, 1940–41, can be considered representative of a war year. Restrictions had been increased, bombing had begun in June and the war had involved in some way practically every family in Bristol.

CASES REFERRED TO THE CLINIC

The number of juvenile offenders who were charged and referred by magistrates and probation officers to the clinic was 68 in 1939–40, and 100 in 1940–41. These children have been classified into groups according to their intelligence (see table).

Group	I.Q.	1939–40	1940–41
		Per cent.	
Normal	86 and over	69	46
Very dull	70–85	7·4	31
High-grade feeble-minded ..	55–70	22·1	21
Certifiable mental defective ..	under 55	1·5	2
Total subnormal	under 85	31	54

An analysis of the war-year cases shows not only a heavy incidence of recidivism (39%) but also an additional and almost equally large group of children (30%) who had committed previous offences—in some cases as many as 11—for which no charge had been preferred. Though technically first offenders, they were in actual fact far from so being. Thus, in all, 69% had committed previous offences.

A further analysis of the recidivist figures brought out the serious problem presented by the very dull section (intelligence quotient 70–85). Intelligence distribution among 39 children previously charged was as follows:

I.Q. under 70 ..	8 (21%)	86–100	9 (23%)
70–85	19 (49%)	Over 100	3 (7%)

The importance in social adjustment of a normal home background with adequate and consistent domestic discipline, and the unsatisfactory state of affairs which results when these factors are missing is indicated by the following figures:

	Per cent.
Parents divorced, separated or deserted	15
One parent dead, away from home for long periods, or both parents working	15
Other domestic factors	22
Total	52

Out of this 52% it will be seen that in at least 30% a "broken home" was a contributory factor.

Parallel with these analyses, an assessment was made of the children who were seriously backward in their school work, even when full allowance had been made for their limited mental capacity; 63% fell in this group in 1939–40, and 47% in 1940–41. In both years, twice as many offences were committed in the half year October to April as in the April to October half. Among the mentally subnormal groups, however, the numbers in the winter were twice those of the summer months in the peace year, and had risen in the war year to three times those of the summer months.

DISTRIBUTION OF THE INCREASE

There has been a 47% general increase in the numbers referred from the juvenile courts in the war period 1940–41 compared with 1939–40. Among the mentally subnormal groups, the increase has been a disproportionately greater one of 74%.

Normal children.—It is encouraging to notice that among children of normal mentality there have been considerably fewer charges during the war period. Whether the decrease of 23% indicates actually fewer offences in this group, or whether the apparent decline is merely the result of more opportunities of committing offences with less chance of discovery, is impossible to discuss from these figures. There are, however, justifiable grounds for believing that the more intelligent children are more readily able to find substitute occupations and recreations when their normal outlets are closed or reduced by war-time conditions. When fathers are in the Forces or mothers are at work, many of these children now assume greater responsibilities and tend to take a larger share in the organisation of the home and in consequence have less time on their hands for possible mischief.

Very dull children.—The main rise in numbers has been in the group of children classified as very dull. In this group (I.Q. 70–85) the numbers have risen sixfold and they now account for nearly a third of the total cases. These children at 14 have mental ages ranging from 9½ to 11½ years. They have little foresight and are unable to work out in advance the consequence of their actions. Their memories are poor so that they learn very slowly from experience. Being less critical, they are more suggestible and easily led astray. With these handicaps they require more supervision than children of normal intelligence and though not actually defective they are often mentally inefficient. Under war conditions they are receiving not more but less supervision. In many cases the father has left home for the Forces, or is less often at home, either working on night shift or overtime in armaments factories, or is in one of the civil defence services. In some cases, the mother also has less time in the home than formerly; she is either working on munitions or in the defence services, or is in some other way attempting to supplement the family income to meet rising costs.

Added to the decrease in parental supervision, there is also the effect of the disorganisation necessarily brought about in the schools by damage, evacuation of personnel, altered hours of work and disturbed nights. School-attendance officers are heavily overworked. Yet they often have to waste valuable time in abortive efforts to make contact with the parents of children who for no other reason than lack of supervision are failing to attend school. These seriously dull children have more drive than those in the more defective groups, but their drive is often uncontrolled and misdirected. It is not surprising that the main increase in juvenile delinquency comes from this group.

High-grade feeble-minded children.—These children at 14 have mental capacities equivalent to children of 7½–9½ years. They are certifiable under the Education Act 1921, but not under the Mental Deficiency Act 1927. In this group (I.Q. 55–70) the actual numbers during the war year rose by 40%, though the proportional incidence remained constant at about 21%, or a fifth of all cases. This percentage is alarming, since the proportion of people normally found to fall in this group from a cross-section of the whole population is only 1·5–2%. These children are not suitable candidates for institutions or colonies for the lower grades of defect. With suitable training they should become economically independent adults; from their ranks are drawn a large proportion of the casual labourers and unskilled artisans essential to industry and the maintenance of the public services. On the other hand, they are unlikely to benefit from residence in a Home Office approved school. They find difficulty in grasping the relation between cause and effect, and with the handicap of a poor memory they lack common foresight and cannot readily learn from

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previous experience. They do not give satisfaction on probation, for though they are often suggestible and readily give promises they are incapable of keeping these promises of better behaviour without consistent supervision, and seldom see any connexion between their actions and the consequences. There is thus no satisfactory provision for them and they remain a dangerously weak link in the social structure.

Certifiable defectives.—The last and smallest group to which attention is drawn is that of defectives certifiable under the Mental Deficiency Act 1927.

These children (I.Q. under 55) at 14 have a mental age below that of an average child of 7½ years. The actual percentage of these sent by the juvenile court to the clinic remained the same in the war year as in the previous year (about 2% of all cases) although twice as many of these children were actually referred. Very few of these defectives have sufficient initiative to get into serious trouble, and such cases as pass through the courts have as a rule been exploited by people with relatively higher intelligence. It should be noted that of 40 children belonging to the last two groups of defectives referred from the juvenile court, only one had attended a special school; the other 39 had attended an ordinary elementary school. Incidentally, in a period earlier than the two years under discussion, out of 70 juvenile-court cases who were defectives only one had been to a special school. It does not require much imagination to envisage the wastage which this state of affairs involves in the efforts of the school staffs, in the slowing down of the education of the more normal children, and in the apathy induced in these defective children by failure to keep up with the normal curriculum.

The extent of recidivism, particularly among the more seriously dull groups, points clearly to the present lack of appropriate provision for dealing with those who are mentally incapable of profiting from warnings and who do not understand the meaning of probation as a period in which to prove their ability and their intention to keep out of future trouble. Their attitude in fact is rather that probation offers a "soft option" and they feel that they have justifiable cause for resentment and complaint if probation is not renewed on the occasion of further charges. In the borderline groups (I.Q. under 85) it is hardly surprising that they should take this view since, when approved schools are unwilling to accept them, there is no other course open to the magistrates. That birching has not the deterrent effect in these dull children commonly attributed to it has been proved over and over again by the number of cases in which such punishment has been carried out as often as four or five times in as many weeks, without any improvement in the attitude of those who have received it.

HOME AND EDUCATION

Present abnormal conditions are revealing more clearly than ever the importance of consistent home discipline and normal family life as major factors in social adjustment. Juvenile court cases for the past year provide evidence for study of the factors which are hampering preventive measures. Economic deprivation in itself is not so great an aggravating factor in the increase in juvenile delinquency as the lack of consistent parental control. Occasional sporadic attempts at severe punishment for misdemeanours which are as frequently condoned or allowed to pass unchecked results in an equally unreliable attitude on the part of the child, especially when the parents' attitude swings unaccountably from injudicious harshness to foolish leniency. Many parents in court, fearing that they will be censured, attempt to give a misleading impression of having exerted a satisfactory degree of control, but directly they feel that the immediate crisis has passed relapse into their favourite attitude of laissez-faire. Such parents cannot be relied on to coöperate satisfactorily in probation. It is significant that in more than half the cases charged during the past year there was evidence of lack of normal home discipline. Present social conditions are undoubtedly contributing to an increased number of homes where parents are absent for long periods, or where owing to the demands of night work they must sleep during the daytime and so cannot give normal supervision. Lack of control cannot be attributed to war conditions alone. In 15% of cases there was a history of unsatisfactory matrimonial situations, while in a further 22% none of these factors was present and lack of control was mainly due to poor intelligence or ineffectual handling on the part of both parents.

Backwardness in school work was further investigated among the juvenile delinquents and a very high proportion of educationally retarded children was found. These children had failed to reach their possible level, even when full allowance was made for their intellectual defects. Among juvenile delinquents of school age, there has been a rise of 6% in those children who are failing to make the progress of which they are mentally capable. This figure does not include those dull and defective children who are working up to their limited capacities. These educationally backward children are acquiring or have already acquired a habit of failure, they are beginning to drift and will continue to do so when they leave school. Of children of employable age, we found 60% seriously educationally retarded in the fundamental subjects. This figure for Bristol delinquents closely corresponds to the percentage of children found to be seriously educationally retarded among 4000 juvenile delinquents examined in the London metropolitan area a few years ago.

The long blackout hours in winter involve restrictions of many possible outlets which are available in the long summer evenings. These restrictions are felt to some extent by everyone, but whereas people of normal abilities are able to find recreation in reading or in constructive occupations and hobbies those children who lack both interest and skill in such pastimes spend their leisure time in aimless wandering and street gang play and do not easily discover substitute occupations. Such children are only too ready to take advantage of the opportunities to enter damaged buildings, and to tamper with the easily accessible A.R.P. equipment in public shelters, without either realising or considering the possibility that their actions may involve other people's safety or property. Many of them come from housing estates of the slum-clearance type. Geographically healthy, these estates are too large to have any sort of social cohesion, while opportunities for corporate life and recreation are fewer than were available in the neighbourhoods from which the families originally were moved.

RECOMMENDATIONS

War conditions, including evacuation, necessitate a short-term policy during the war and a long-term policy for peace-time conditions. Ascertainment of dull children in the schools should of course be continued and if possible extended. At present, there is little or no provision for half the class of children coming before the juvenile court in increasingly large numbers.

Very dull children (I.Q. 70–85) are not certifiable under either act, and neither can nor should be segregated with lower grade defectives (I.Q. under 55) in colonies. On the other hand, they are not welcomed by the headmasters of approved schools, and rightly so, since they cannot benefit from the curriculum of the ordinary approved school. At present these cases can only be put on probation, and in spite of the devoted labours of the probation officers it must be acknowledged that results in this group are unsatisfactory. Very dull children over school age are found by employers to be poor workmen, and in consequence they are always changing their occupation. Parental discipline is often absent, owing to war conditions, and opportunities for adventure are multiplied, particularly in bombed areas. Much more supervision than a weekly interview by the probation officer is required in these cases. As things are the child comes again and again before the court, and the numbers of such children are far out of proportion to their percentage incidence in the population.

A special approved school is needed for these children, with an appropriately adjusted curriculum in which class-work should occupy only part of the time and should be linked with occupational training suitable for their limited capacities and likely to be an important factor in fitting them to live in the general community. Eighteen months or two years in such a school would condition these children and provide them with the necessary day to day supervision and discipline which is so badly needed. If an effort were made to train them to make full use of their capacities, even if limited, they should

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be able to take up a suitable occupation on discharge with some hope of permanence.

The same remarks apply to high-grade feeble-minded children (I.Q. 55–70). These are certifiable under the Education Act, and if of school age can be sent to a special school, but they are not certifiable under the Mental Deficiency Act, and are not suitable for segregation in existing colonies, which are intended for those whose social incompetence is of such a degree that they are incapable of attaining economic independence. It is even more difficult to find suitable employment for them than for the very dull, and they are extremely difficult to supervise on probation; moreover, their parents are often borderline or actual defectives, and are unable to exercise proper discipline. Were there suitable provision in residential special schools for many of this type, it is unlikely that anything like the disproportionately large numbers of them now being charged would ever have to appear in court. The heavy incidence of delinquency among them is not merely a war effect; in more normal times anything from 10 to 15 times as many cases appear to be drawn from this group as should reasonably be expected if they appeared roughly in proportion to their incidence in the general population.

Many certifiable defectives (I.Q. under 55) who come before the courts would never have been charged had they been given the chance of training at a day occupation centre, which if properly organised should fit some for partial self-support and would at least keep others out of mischief. Those who in spite of such training, or from lack of suitable home circumstances, were found still to be incapable of social adjustment should, of course, be certified and sent to a colony.

Evacuation.—Neither the high-grade feeble-minded (I.Q. 55–70) nor the defectives (I.Q. under 55) are suitable for evacuation to ordinary billets in reception areas. Quite a number, however, have been sent and have given a good deal of trouble to the foster parents and to the authorities in the reception areas. Children with I.Q. under 55 cannot be expected to receive from the ordinary billeting arrangements that training and supervision which colony placement provides. They should therefore be certified and sent to such institutes as are provided in comparatively safe districts outside the city. Children with I.Q. 55–70 should normally be certified under the Education Act and sent to a special school, though nothing like full advantage has been taken of the available powers, partly because of the limited accommodation available in Bristol. These children, if evacuated, should go en bloc, as a residential school or schools. They require special supervision and teaching which cannot be provided in the ordinary billets or in the ordinary rural schools—which, with the advent of evacuees, are usually understaffed.

Some of the very dull group (I.Q. 70–85) would also do better in a residential school or farm institute than in ordinary billets. This applies particularly to those who have been in frequent trouble. School work would not take up all the syllabus, and a good deal of time could usefully be spent in outdoor work or in an occupational centre which could be easily provided in a farm school.

Children remaining at home.—In all cases where parental supervision is inadequate and a child is defective within the meaning of the act, he should be sent to a colony outside the target area. The high-grade feeble-minded (I.Q. 55–70) should be drafted into a special school, where there should soon be more places available owing to evacuation. It is to be hoped that magistrates and teachers will encourage parents to take advantage of special day-school provision. For the group of very dull children (I.Q. 70–85) who form the "C" and "D" streams in many schools, it would probably be useful if less class-work and more occupational work could be arranged.

For all groups, during the winter, further organisation of leisure is needed to provide outlets for misdirected energies and the desire for adventure normal in the growing boy and girl. Much good work has been done on a small scale during the past winter in the social centres which have sprung up all over the city in crypt and basement shelters. These provided the atmosphere of a club where neighbours could meet their friends in the evening in safety, and replaced to some extent the usual recreations made impossible by the blackout and A.R.P. More centres might be developed on these lines in places of safety, where parents could send their children, not to sleep but to spend the evening. Recreational facilities such as film shows and concerts in these centres might be expanded.

Long-term policy should be preventive. The present provision for both very dull and defective children is inadequate. It is essential that sufficient special school accommodation should be provided after the war for the group of high-grade feeble-minded, and one such school should be residential. Early ascertainment and the transfer of children with I.Q. 55–70 to a special school where the curriculum will be suited to their special requirements, including occupational training, will be desirable if these children are to be brought up as good citizens playing their parts according to their talents. If they are to be prevented from drifting into an apathetic state in which they are only conscious of all-round failure, or into a situation where they can evade all training and education because of lack of provision for their needs, it will be necessary to develop what skill they have so that they may take that pride in their work which is necessary to every citizen's self-respect.

We wish to thank Councillor F. C. Williams, chairman of Bristol education committee, for permission to publish this paper, and Lady Inskip and Dr. J. F. Lyons for their interest.

PARALLELS IN NURSING PROBLEMS

AFRICA is in the act of developing a nursing service to meet the special needs of a scattered and superstitious rural community. It might seem on the face of it that nursing problems encountered there must differ fundamentally from those which trouble us here; but Dr. Janet Welch's study [1] of nursing education in relation to the cultural background in East and South-East African colonies shows that we can learn from their difficulties, as they can learn from our mistakes. Speaking at a meeting of the Overseas Association of the Medical Women's Federation on Oct. 20, Dr. Welch said that it would be difficult to set up any systematic form of nursing education in the African colonies until it was clear whether the policy of the medical authorities was going to put emphasis on curative or preventive work. She believed that the hospitals must be centres of social teaching and the nurses must be trained as community nurses from the start, with a sound education in the preventive aspects of hygiene, midwifery, maternity and child-welfare work, and nutrition.

A BACKGROUND OF WITCHCRAFT

In Africa, as here, the standard of education in the nursing candidate is often lower than could be wished. But whereas here secondary education is available for all who attain a given standard, in many African districts primary education alone is available. Thus at the time of Dr. Welch's survey, Makerere College in Uganda was giving a full secondary education course, and several other schools were giving incomplete courses; in Kenya there were no schools giving a full secondary course but two grant-aided missionary schools offered junior secondary standard; in Tanganyika five schools were giving some secondary education and in Nyasaland and Northern Rhodesia no secondary education was available. It is difficult, even in England, with a background of Western culture, to imbue some of the girls now enrolling with any precise idea of the principles underlying aseptic technique and barrier nursing. With an African girl coming from a home where sickness is automatically attributed to witchcraft, and to whom the idea of bacteria as a cause of disease is completely foreign, the difficulty is formidable. If she has reached standard six she may be able to follow simple explanations in English; if not she must be taught in the vernacular. Yet these obstacles can be overcome and Dr. Welch records how.

She introduced a group of African mothers in a village clinic to the conception of bacteria by easy stages, first

1. Made possible by a grant from the Carnegie Corporation, New York, and printed by the King's Crown Press, a division of the Columbia University Press. It can be obtained from the Carnegie Corporation, New York City, or from Miss Wrong, International Committee on Christian Literature, 2 Eaton Gate, London, S.W.1.

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showing them how spectacles—with which they were familiar—enlarged the size of letters; then letting them magnify common objects with a hand lens, so that they came to realise that invisible things might be enlarged until they became visible. After this the women were introduced to the microscope and quickly learned to see new detail in familiar objects—dust on a hair, dirt on a fly's leg, pollen in a flower. Then followed a discussion of the idea that invisible things might have life—things smaller than a mite—and the women were sent to draw water from the stream which they used for bathing, drinking and washing. "The demonstration of amœbæ and other microscopic water life in what appeared to them as clear water astounds them, but convinces them of the world of micro-organisms in a way that weeks of verbal description would not." It is easy to make the final step and persuade them that some living organisms are the cause of disease if they enter the body.

This "laboratory approach" would make it possible to teach the nurse the principles underlying her training, and also to introduce the preventive aspects of her work from the start.

GIVE ME THE FIRST YEAR AND ——

Many of the African girls marry and leave the nursing school within a year of entering. During their first year they are used largely as unskilled labour to run the hospitals, and there is little attempt to equip them as future educators of their people. Dr. Welch believes that the first year of training can be so planned that it is a unit in itself, providing the nurse with standards and principles for the prevention of disease. Thus, however short her training, she would return to her home fit to teach her friends something better and to establish new ideas of hygiene, nutrition and the care of the child. This is especially important in Africa because the women control the acceptance of new ideas. Many of the tribes were originally matrilinear in structure, and the women maintain their authority because of their importance in the social economy of the tribe as planters, reapers and marketers of the crops. Thus any advance in public health must first win the approval of the women, many of whom are jealous guardians of tribal medical practices. They are largely inaccessible to teaching from medical men, especially in obstetrics, for most of them will not tolerate the presence of a man at a confinement. The one person likely to gain their ear is a fellow African woman trained as a community nurse. Dr. Welch has proposed a first-year course for the student nurse in which this principle is accepted.

In her first term the student is introduced to microbiology in the manner described, to anatomy, physiology and very simple biochemistry (as a background to the understanding of nutrition); to the ways in which health can be maintained in the community and the family, to the history of medicine and nursing told like a story; and to simple nursing arts. Thus at the outset her attention is oriented not to sickness but to health and its maintenance. She is also encouraged to discuss the magical practices of her people and to see how some have aspects in common with her new knowledge, while some are dangerous; and she must be taught how to teach all this to others.

In her second term she begins the study of nutrition and of diets for infants and children, and is helped to adjust herself to the social and ethical duties of the professional nurse.

In her third term, in addition to her other studies, she learns the properties and dosage of drugs—important for a people who use active herbs in dangerous quantities in their magic—and is introduced to sick nursing and to the study of the common diseases of the country, including communicable diseases.

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This course, with its emphasis on health and prevention, on principles and practical work, might well be modified to suit English conditions and be taken by our own first-year nurses. But clearly it could never be demanded of a girl who is expected at the same time to give routine service in the hospital wards. It is a course for a student, not an apprentice. Dr. Welch hopes to see African nursing freed at the outset from one of the gravest handicaps of our own system. The British student is expected to give long hours of service which prevent her from making the best use of what systematic instruction she receives; lectures attended after a day in the ward must be outstanding if they are to excite more than languid attention. The defect could be largely overcome if the nursing school existed purely to train and turn out the best possible nurses, and if it was financially independent of the hospital, which would have to be run by its own fully qualified staff. This has been tried successfully in America and Canada, and in various European hospitals established by the Rockefeller Foundation after the last war. In such a hospital in Warsaw an entire ward at a time is given over to the students under the charge of the staff of the school of nursing. All the nursing in the ward is carried out by the students, supervised by their teachers, and the cases allotted to them demand a gradually increasing degree of knowledge and skill. At the end of a chosen period the ward is exchanged for another one in which students can gain a different type of experience. Dr. Welch commends this system and suggests that the hours spent by student nurses in the wards should be graded; thus they would begin by spending only one or two hours a day in the ward, the rest of the day being used for instruction in the other items of the course. The working week in the first year would occupy 29–38 hours, with Saturday and Sunday off in the first term, and Saturday afternoon and Sunday in the second and third terms; there would be a month's holiday in the year. This seems to us a reasonable study-week, in line with the hours worked by university students. We can see no excuse for the custom by which a student nurse is expected to work harder than any other class of student; nor is an eighteen-year-old girl physically fitted to spend long arduous hours in contact with the chances of infection which a hospital offers. A reform in our system of nursing to this or a comparable pattern would do much to make the profession attractive to our more intelligent girls.

THE KIDNEYS AND HYPERTENSION

EXPERIMENTAL PROGRESS

WE have known for several years that renal ischæmia experimentally produced causes hypertension in animals. Goldblatt summarised [1] the available experimental data in 1938, when it was already recognised that if such experimental ischæmia was severe enough to impair renal excretion arteriosclerotic lesions would begin to develop similar to those found in essential hypertension in man. It was clear, too, that the rise of tension was produced by some biochemical agent, not by a nervous mechanism. Since then we have learned a good deal more, thanks largely to independent groups of workers in the Argentine and in Indianapolis, and it is possible to set out briefly the points on which they agree. The normal kidney secretes a substance called renin, first described by Tigerstedt and Bergmann in 1893; renin is a pressor substance and was believed until recently to be a vasoconstrictor. Actually, the story is much more complicated than that: renin acts as a proteolytic enzyme on a globulin ("hypertensin precursor") present in normal serum, and converts it into a substance called hypertensin. The Argentine workers consider that renin only has a pressor action because it produces hypertensin, which they regard as the immediate cause of the rise in blood-pressure. The Indianapolis workers, however, have embroidered the theme by showing that hypertensin is not a vasoconstrictor itself, but can only cause vasoconstriction when activated by another substance present in the blood. As if this did not make matters complicated enough, both groups of workers agree that the blood contains a substance which destroys or inhibits the action of hypertensin; and the Indianapolis group go further and say there is a substance which inhibits activated hypertensin as well. With all these substances being manufactured at varying rates it is easy to see that hypertension in man may have multiple causes.

The first step leading to the opinions just set out was the demonstration that venous blood flowing from an ischæmic dog kidney had a vasoconstrictor action on the Lawen-Trendelenburg toad preparation.[2] More-

1. Goldblatt, H. *Bull. N.Y. Acad. Med.* 1938, **14**, 523.
2. Fasciolo, J. C., Houssay, B. A. and Taquini, A. C. *J. Physiol.* 1938, **94**, 281.

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over, if an ischæmic kidney from a dog was transplanted into the neck of another dog the second dog's blood-pressure rose.[3] Again, if the renal vessels of a dog are clamped, the blood-pressure rises when the clamp is released. Although these results had been confirmed many times, observers still doubted whether there was enough pressor substance present in the systemic blood to account for the hypertension. Workers in Toronto,[4] however, showed in cross-circulation experiments that if blood from hypertensive dogs was transfused into nephrectomised dogs there was a transient rise of blood-pressure in the recipients. They thought that other workers had failed to get this pressor effect either because too little blood had been transfused or because the receiving animals had intact kidneys (there is plenty of evidence that normal kidney tissue will inactivate the pressor substance formed in the ischæmic kidney). In their own experiments they used a special pump which ensured that the same quantity of blood passed in each direction, and transferred about 3 litres per hour. Thus the substance or substances produced by the ischæmic kidney were present in the blood in sufficient quantity to cause a rise in blood-pressure. The next step was to investigate these substances. The Indianapolis workers showed that renin in Ringer's solution did not constrict the blood-vessels in an isolated dog's tail[5]; when blood was added to the solution, however, vasoconstriction occurred. Thus it was clear that renin alone had no pressor effect: it acted on some constituent of the blood to produce a vasoconstrictor substance. This is the substance which the Argentine workers had called hypertensin; the Indianapolis workers unfortunately named it angiotonin,[6] thus adding verbal confusion to a subject already reasonably tricky. From accounts of the properties of the two substances there is little doubt that they are identical, and the earlier term "hypertensin" will be used here. Both groups of workers demonstrated[6 7] that renin acted on a globulin—found in the blood but not in other tissues—to produce hypertensin; and that hypertensin had a smaller molecule than its precursor. They also showed that the concentration of hypertensin produced depended on the amount of the globulin present and was largely independent of the amount of renin; and this, together with the facts that renin is heat labile and acts best at a given pH, suggested that it was a proteolytic enzyme. Some of the Indianapolis workers isolated a crystalline picrate and oxalate of hypertensin, but give no melting points or elementary compositions in their paper. The Argentine workers[8] find that hypertensin is inactivated by pepsin, and regard it as polypeptide, though it is reported from Indianapolis to give a negative biuret reaction. The Argentine workers find that when renin is incubated with blood the hypertensin content first increases rapidly, then diminishes and finally disappears; this is held to be due to the action of an inhibiting substance called hypertensinase. Since hypertensinase is also heat labile and has an optimal pH for its action, it too may be regarded as an enzyme. Other observations are that hypertensin-precursor is diminished by injection of renin and increased by nephrectomy; and that nephrectomy also decreases the hypertensinase present in the blood. These observations explain why nephrectomised animals are more sensitive than intact ones to both renin and hypertensin; and also why animals soon develop a tolerance (tachyphylaxis) to repeated renin injections but not to repeated injections of hypertensin. These findings agree in general with those of the Indianapolis group, who have further shown[9] that hypertensin in Ringer's solution produced vasoconstriction in the isolated rabbit ear only on the first trial or two; after these trials, the vasoconstrictor action was lost, and was only recovered when fresh blood was added to the perfusing fluid. Hence arose the conception of a hypertensin-activator. If blood from nephrectomised dogs is used in such perfusion experiments, the vasoconstrictor activity of the hypertensin is greater than it is with normal blood; yet the effect with normal blood is maximal in the sense that no increase in vasoconstriction can be produced by increasing the amount of blood used in the experiment. Thus it can be supposed that there is an inhibitor substance present in normal blood which is diminished by nephrectomy. There is evidence that this substance is not hypertensinase.

Hypertension, then, may be produced by increased production of renin, hypertensin-precursor or hypertensin-activator; or by decreased production of hypertensinase or hypertensin inhibitor; or by combinations of any of these factors. The existence of hypertensinase and hypertensin-inhibitor offers a hope of a method of treating human hypertension, and already at least three reports have appeared recording lowering of blood-pressure in animals and in patients with hypertension. The extracts of kidney used have been essentially similar and the amounts high. The extract from 100–150 g. of pig kidney has been given daily by Jensen and his colleagues[10] to lower the blood-pressure in rats with experimental hypertension; this figure is slightly lower than that given by Page and his collaborators,[11] who show that the extract from 1000 g. of fresh kidney may have to be injected daily for some weeks to improve patients with malignant hypertension. The claim of Grollman and others[12] that oral administration is effective in rats has not been confirmed by other workers. The rat does however provide a convenient animal for experimental assay so that chemical advances may be speeded, and it is on these advances that clinical application must at present wait.

3. Houssay, B. A. and Fasciolo, *Rev. Soc. Argent. Biol.* 1937, **13**, 284.
4. Solandt, D. Y., Nassim, R. and Cowan, C. R. *Lancet*, 1940, **1**, 873.
5. Kohlstaedt, K. G., Helmer, O. M. and Page, I. H. *Proc. Soc. exp. Biol., N.Y.* 1938, **39**, 214.
6. Page and Helmer, *J. exp. Med.* 1940, **71**, 29.
7. Braun-Menendez, E., Fasciolo, Leloir, L. F. and Munoz, J. M. *Nature, Lond.* 1939, **144**, 980; *J. Physiol.* 1940, **98**, 283.
8. Munoz, Braun-Menendez and Fasciolo, *Amer. J. med. Sci.* 1940, **200**, 608.
9. Page and Helmer, *J. exp. Med.* 1940, **71**, 495.

Infectious Disease in England and Wales

WEEK ENDED OCT. 25

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1224; whooping-cough, 1985; diphtheria, 1017; paratyphoid, 53; typhoid, 23; measles (excluding rubella), 745; pneumonia (primary or influenzal), 631; puerperal pyrexia, 143; cerebrospinal fever, 88; poliomyelitis, 50; polio-encephalitis, 4; encephalitis lethargica, 2; dysentery, 139; ophthalmia neonatorum, 77. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 22 was 1287, including scarlet fever, 167; diphtheria, 280; measles, 20; whooping-cough, 511; enteritis, 22; chicken-pox, 23; erysipelas, 28, mumps, 3; poliomyelitis, 6; dysentery, 18; cerebrospinal fever, 16; puerperal sepsis, 12; enteric fevers, 42; other diseases (non-infectious) 47; not yet diagnosed, 92.

Deaths.—In 126 great towns there were no deaths from measles or enteric fevers (1 from enteric in Greater London), 2 (0) from scarlet fever, 16 (2) from whooping-cough, 31 (3) from diphtheria, 56 (3) from diarrhœa and enteritis under 2 years, and 15 (0) from influenza. The figures in parentheses are those for London itself.

Fatal cases of diphtheria were scattered over 19 great towns, Liverpool reporting 4. There were 8 deaths from diarrhœa in Manchester and 7 in Birmingham.

The number of stillbirths notified during the week was 176 (corresponding to a rate of 32 per thousand total births), including 20 in London.

10. Jensen, H., Corwin, W. C., Tolksdorf, S., Casey, J. J. and Bamman, F. *J. Pharmacol*, 1941, **73**, 38.
11. Page, Helmer, Kohlstaedt, Fouts, P. J. and Kempf, G. F. *J. exp. Med.* 1941, **73**, 7.
12. Grollman, A., Williams, J. R. jun. and Harrison, T. R. *J. biol. Chem.* 1940, **134**, 115.

NUTRITION IN IRELAND.—The *Irish Press* of Oct. 17 announces that a dietetic council has been set up "to experiment on ways and means of aiding the people's nutrition under war-time conditions, paying special attention to children's diet." The following have been appointed: Dr. P. T. O'Farrell (chairman), Prof. W. J. E. Jessop (secretary), Prof. W. R. Fearon, Dr. Catherine O'Brien, Dr. John Mowbray and Dr. Oliver FitzGerald.

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Public Health

Future of the School Medical Service

Dr. E. H. Wilkins [1] has lately suggested some reforms to improve the school medical service and make it coherent with any general plan for a complete medical service for the nation. He divides the existing defects of the school service into those remediable by changes within the sphere of the service itself or of public hygiene, and those which are bound up with the progress of general social welfare. The school medical officer, unlike his colleagues in other branches of the profession with the exception of the obstetricians, deals mainly with people who are, or are presumed to be, healthy, so most of his work is more closely allied to social amenities than to the treatment of the sick. Yet he came into existence with the object of doing work which is strictly medical—to detect and obtain treatment for children who were unhealthy and who, in the state of medical practice as it was 35 years ago, missed the attention of the family doctor which they should have received. He has always been difficult to place in the medical hierarchy and in consequence occupies a somewhat low position though in fact his work is now the highest objective of the medical profession. Wilkins takes the view most generally held that the school service should be incorporated with the other health services, the medical officer of health being the chief school medical officer and the assistant school medical officer also assistant medical officer of health. The advantages of this system are fairly obvious, but it has several drawbacks. James Kerr pleaded consistently for the separation of school medicine from general public health, though his immediate successors who were independent of the public-health office were in general not in favour of the separation. The objection to the fusion is that school medicine has become highly specialised; to be successful the practitioner must give his life to it, and it is not in the interest of the work or of those who undertake it that school medicine should be a side issue and a stepping-stone to general public health. The advantages of liaison of school work with other public-health functions, especially with infant welfare, outweigh all possible disadvantages so far as the service is concerned, but the subsidiary position of those who do the school work is against its development. A matter which gave rise to much contention in the past is the relationship of school medical officers with general practitioners. School medicine was one of the first and certainly the greatest of the encroachments of public medicine on private practice. This controversy has died down for a time, but it will come up again should the planning of the future of medicine develop on the lines of national health insurance. Specific medical treatment is no real part of school medicine, but supervision and management of children certainly is, and there is no fixed division between what is treatment and what is management.

The reforms needed in the technical part of school medicine must be left to the school medical officers themselves to settle. The discussion over the value of periodic medical inspections, in which Wilkins is emphatically in favour of their retention with several modifications, can be understood only by those who are familiar with the work and with its aims; but the pursuit of its aims calls for great reforms in the social welfare of the people, for poverty in all its aspects and implications is the great stumbling block to the maintenance and development of health. Most of the work of school medical officers is among normals, by which is meant average samples, and its failure has come from confusing normality with full health, a mistake made constantly in all medicine, for we have so little experience of full health that we can hardly be said to know what it is like. We see this mistake outstandingly in the assessment of nutrition, about which Wilkins has much to say. However we may define nutrition, it is certain that the vast majority of children are round about the normal, but it is equally certain that few if any of the normals are in the state of maximum nutrition which alone is the state of health. The achievement of this maximum does not lie within the province of medical attention, but in obtaining the best environmental conditions, especially during the period of development. Wilkins says truly: "The implication that the classifying of 90% of children in the first two of the Board's categories ("excellent" and "normal") indicates that these children are well fed is sheer nonsense, conflicting as it does with a mass of evidence based on ascertained fact." The object of school medicine is to raise the standard of normality in all particulars so that it approaches nearer to full health. This of course calls for some treatment which the medical profession can furnish, but far more for social treatment to raise the level of general environment.

1. *Med. Offr.* Oct. 4, 1941, p. 109.

From the Annual Reports

CHELSEA

From Dr. Leslie McCarthy's brief report for Chelsea we learn why the population shrank from the 1939 figure and the death-rate rose. "Other violence," mainly war casualties, caused some of the total of 851 deaths. Of the other deaths, 204 were due to heart disease, 106 to cancer and 68 to vascular lesions. This suggests that the population of Chelsea which stayed was elderly. As Chelsea was an evacuation area throughout the year the average population will have been less than the mid-year population, so the true death-rate, whether crude or corrected, will be higher than the 22 recorded. What was the standardised rate, which alone reflects the health of the population, will never be known.

EASTBOURNE

This county borough was a reception area in the first half of the year and an evacuation area after the fall of France, since when it has been a restricted area. In contrast to Ramsgate it suffered little from air-raids, and because it has always been more of a residential town for retired people than a holiday resort it has suffered less from the loss of its visiting population than other coastal towns. Dr. J. Fenton's report for 1940, though typewritten and curtailed, does not therefore differ greatly from peace-time reports, and from it one could not tell that there had been any serious disturbance in the town's history except for a decline in the population. The increases in the infectious diseases noticed at the end of 1939 did not continue, with the exception of scabies. Whooping-cough gave 159 notifications, 126 of which occurred in the first quarter, and none in the last four months of the year; and measles 105 notifications, 57 of which occurred in June–August. These seasonal incidences were unusual, for in the country as a whole whooping-cough increased and measles diminished as the year progressed. There was no death from either disease.

RAMSGATE

Dr. J. V. Walker's report is of exceptional interest for in the latter half of 1940 Ramsgate was in a state of siege and subject to repeated air attacks on a heavy scale. In peace-time its population was made up of an unusual proportion of elderly people, and in view of the danger of invasion an evacuation scheme for them was instituted. It was expected that this would be made compulsory, but it was not, so the process of getting the old away to safe areas was both lengthy and incompletely successful. Evacuation of mothers and children offered no special problems, but as the risk of invasion came suddenly it had to be hurried. The normal population of Ramsgate is 34,000, but the statistics are of course based on the estimated population in the middle of 1940. The growth of a troglodyte population in the famous tunnel shelters might have been expected to influence the town's health, but it is doubtless thanks to them that the casualty lists were so small. Of the 490 deaths registered in the town in 1940 the heading "other violence" includes civilian deaths from enemy action. Elsewhere shelters were used as dormitories but at Ramsgate a small proportion of the population shifted their homes underground and seldom came out of the tunnels at all. There was little excuse for this since owing to the evacuation there was ample accommodation. In view of all this we should expect a very unfavourable health record for the town; but excluding the casualties there is no evidence that the town's health has suffered. Indeed, the year's record is that of a healthy year with low prevalence of communicable diseases. There were

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no deaths from the typhoid or dysentery groups of diseases and only one death from diarrhœa in an infant of six months. The respiratory deaths numbered 65, but 49 of these were ascribed to bronchitis, suggesting that the comparatively high rate arose from the age of the population and not a high prevalence of respiratory infections.

In England Now

A Running Commentary by Peripatetic Correspondents

I OFTEN try to read a newspaper and listen to the wireless at the same time and generally end up by missing the point of both. Of course there are fellows who can play a dozen games of chess at once and could probably read and listen to a story or two as well, but I'm not one of them. I can't listen to even two tales at once. The other evening I went in to have my pint in the bar parlour of the Locums' Arms. This is where the locums rest between engagements, and there were several there, grousing and drinking. On my right an old locum was holding forth to a friend and over in the corner was a young locum doing the same thing. "Some people," said the Old Locum, "take to war-time rationing con amore." He wiped the froth meditatively off his walrus moustache. "Yes; for other people. My last engagement was a seaside job of three weeks. The man had gone away for a holiday, but his wife who was a part-time invalid stayed to look after me, leastways that's how they put it. Well, for the first breakfast I had a sardine on toast, one. Same thing the next day and the next. I fed alone, but used to see savoury trays—eggs and bacon from the smell—being hurried furtively upstairs. The lady didn't come down till midday. 'Oslo breakfast,' she said one day, 'so healthy!' 'How I wish I were up to them!' said I. 'I had no idea they were having quite such a terrible time in Oslo. Do you mean to tell me they have only one . . .?'" Then I heard the Young Locum's voice away in the corner. "It was only a week's locum, the whole family were going away for a holiday. Before he went the doctor said to me, 'We're having the house done up a bit, hope you won't be disturbed.' Next morning the cook asked if I would mind having lunch in the drawing-room as the whitewashers were in the dining-room, and sleeping in another bedroom. Next day it was: would I mind having meals in the study and sleeping in the nursery. On the fourth day I was having meals in the surgery and sleeping in a dressing-room, but next morning they were both seized by a whole army of painters, paper-hangers, carpenters and whatnot; in fact they had the whole house now except at the very top where there were two rooms, the cook's and another. Of course I had to sleep in the other and heard her snoring. Well, I thought they were going to leave the top storey alone, but I had scarcely finished dressing when the vanguard of this renovating army . . ." "It wasn't as though there was any shortage of food in the house"—it was the O.L. that I was listening-in to now—"the cupboards in my bedroom were simply crammed with tinned meats, jams, pickles, masses of it. Well, it must have been about the sixteenth day and I was getting well into the third row of that tin of sardines . . ." "Apparently" (Y.L. speaking) "they weren't going to touch the cook's room, so I was wondering . . ." "My stomach was definitely in revolt, that damned fish repeats itself like a parrot, so that morning on my rounds I stopped at a shop and bought a tin-opener . . ." "Well, the cook came along as usual and said would I mind . . ." "By Jove, that night I fairly let myself go." Who said that? I'm not sure. It may have been both together. "Time, genelmen, please."

* * *

We have noticed four classes of faint among our donors. Those who throw the first or fourth class should never have been enrolled because they are temperamentally unsuitable: the second variety (a "forme fruste" of the first) is preventable with careful handling, while the third must be attributed to mismanagement of the donor after the withdrawal of the blood.

The first class is seen in the extremely apprehensive donor who may have volunteered from self-disciplinary or purely altruistic reasons, or may have been pressed into service in the presence of his colleagues or fiancée. Such a person may faint in the waiting-room or on the couch while his arm is being cleaned up. At one factory some youths flopped down like ninepins while waiting their turn to be grouped. The sight of bottles of freshly drawn blood or blood-stained gowns, too much theatre ritual or the smell of ether (acetone is not associated by the patient to the same extent with hospitals) may precipitate the faint. This type of person should never have volunteered and if he is recognised at the time of enrolment he should be rejected.

The second class turns up in the person who does not mind the beginning (indeed he may be quite interested and will try and sit up and have a peep at the blood running out) but after a few minutes a feeling of nervousness comes over him; an occasional sigh, a rapid turn away of the head, and a nervous cough are the first signs. He begins to think "will they be able to stop it?" If the doctor leaves the needle in situ and goes away to prepare the next patient, the feeling of insecurity will continue to thrive. During a brief period of hyperacusis he will hear his blood trickling into the diluent in the bottle and he may hear the nurse say "Its running ever so fast: I wish they all bled as quickly as this." The actual faint will follow rapidly and the flow of blood will diminish reflexly. This type of donor has probably fought a strong inclination not to show up for his appointment and he sometimes tries to pass off his nervousness with forced merriment and interest; hence his desire to "have a look" and the occasional pleasantry whereby the shed blood is compared to a favourite brand of stout. With care, this type of donor, who can often be recognised when he comes in by his jocularity and the excessive pulsation of the great vessels of his neck, can be successfully bled, for he will readily take the initiative in conversation which interests him. The doctor should not leave him unattended and mentally unoccupied, while assistants should be discouraged from making comments and quips on the rate of flow. A word of encouragement will help him through his ordeal, and the doctor will be rewarded by "Is that all it is?" and a pressing and genuinely meant request to call him again.

The third kind of faint is a vasomotor attack probably beyond the control of the donor. It is as a rule due to sitting up suddenly and too soon to drink coffee presented by an overzealous helper. This type of faint will also occur, without the donor sitting up, if the blood is withdrawn too quickly. Fasting will also tend to induce it: likewise if the donor is overtired, or has hurried to be in time, or if the atmosphere of the room is oppressive. Some people seem to take longer than the average to adjust their circulations and we have seen this tendency in a mother and daughter who were each unaware of the reaction of the other.

The last class is troublesome; it is the hysterical faint induced whenever an impressive audience is available. The subject is almost invariably a young girl and she should be allowed to faint into the arms of a member of her own sex. A favourite place is in the street outside the bleeding post and unless the offender is skilfully and promptly handled the post and the team may be held in considerable disfavour and distrust by the cross-section of the public who congregate so rapidly for this windfall entertainment. We have seen a husband and wife (only the wife had volunteered) go from one "fit" into another, falling into any kindly arms willing to receive them and causing confusion and consternation among the volunteers in the waiting-room. By the way, it does not seem to be generally known that faints, if complete, may take on an epileptiform character. They can, however, readily be differentiated from hysterical attacks. The act of fainting is commonly followed by a feeling of tiredness and this may be attributed by the donor—and what is more important, by his friends—to the loss of blood. A donor who has fainted should always be warned against this feeling of tiredness, and for the same reason it is unwise to continue withdrawing blood after a faint has begun. Donors should be warned of the possibility of bruising, and of bleeding starting again, and should be told how to deal with bleeding by pressure. They should be warned not to touch the dressing unless the wound is painful and then to show it to a nurse or a doctor. Over the tea-table, when the donor has returned home, she will probably be invited

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to relate her experiences and the kid brother and his friend will certainly want to have a peep at "the hole in the arm." This understandable curiosity is probably the comonest cause of local sepsis.

* * *

It has taken a second world war to convince me that pectoralis major is intimately concerned in the act of defæcation. But I must begin at the beginning. My gardener was called up last year and I was obliged to tackle a third of an acre singlehanded. I mow the lawns every three weeks. This represents the optimum interval on a time-growth curve which I have worked out for this part of the country; the fourteen-inch mowing machine of the 1920 age-group has been carefully integrated to other variables. About a fortnight ago I was rushing downhill behind the machine, my eyes fixed on a luxuriant tuft of grass which I intended to cut as clean as a whistle. I allowed the blades to engage when I was about two yards from my objective, and with savage determination threw myself into the attack on the waving green spikes. A sudden crack, and I found myself staggering across the lawn gasping painfully for breath and rubbing my chest in the region of the second left costal cartilage where I had collided with one handle of the mower. I had forgotten that behind that innocent tuft of grass there lay hidden a small grid covering a drain ventilator. "Pooh!" I exclaimed, but the explosive was cut short by a stab of pain which made me hold my breath. I sat down gingerly on the lawn, lowering myself on extended arms, but the manœuvre ended in a groan. I would have sat longer, but there were unmistakable sensations indicating that the grass was not as dry as I had imagined. To immobilise the injured muscle I decided to raise myself using only my right arm. But seemingly the pectoral girdle never does things by halves, and I was conscious that it had gone into action even while I was at the stage of visualising the extent of the wet patch on the seat of my trousers. The next day was full of discoveries, including the one mentioned in my opening sentence. Fortunately there was little cause for the turbulent movements of the thoracic cage which are associated with laughter, and a suppressed cough was usually achieved by fixing the left side of the chest against the edge of a door. The sigh over the blackout was stillborn and the bedtime yawn hovered in midair. As for the night, it was made hideous with moans which synchronised with attempts to change my position in bed. Great though my discomfort was, I little realised that worse was in store. I was in the bus on my way to hospital. Suddenly I was aware that the awful thing was about to happen. It was too late to avert the impending catastrophe. I whipped out my handkerchief, being a faithful disciple of Bourdillon, and there followed a gigantic sneeze. The pains of hell got hold upon me and the explosion merged into an involuntary roar of anguish. The bus stopped. The driver's terrified face appeared at the hatch, anxiously seeking an explanation from the conductor. I have since thought that he must have been driving in a dream state, and on hearing the cry had leapt to the conclusion that he had run over a pedestrian. He was reassured by the young woman who was our conductor; amid a muttered chorus of disapproval from my startled fellow passengers she jerked her thumb in my direction. "It's 'im," she said simply. On arrival at the hospital my first call was at the radiological department. Sister, full of sympathy, offered to send the report to my ward as soon as the radiologist had reported on the film. An hour later it was handed to me in a sealed envelope. I opened it eagerly, impatient to learn how many ribs had been broken. My colleague had confined himself to a single word: NIL. "Pshaw!" I exclaimed, wincing with pain.

* * *

I was a very puzzling case. On Sunday I lost my appetite and felt off colour. Next afternoon I had a dull headache behind the eyes, which slowly got worse. On Tuesday evening I felt shivery and had a temperature of 100° F. Taking a couple of Veganin tablets and a stiff hot whisky I went to bed early, only to be awakened at 4 A.M. by persistent shivering in spite of piling all the garments I could find on my bed, and by 8 A.M. I felt so ill I decided to stay in bed. That evening I felt colder than ever in spite of numerous hot-water bottles and had an awful headache. My temperature had risen to 103°, my pulse to 130, and I had developed a sighing type of respiration at 36 a minute. I felt increasingly sick and was, the vomitus being dark brown and dirty and very acid to the mouth. I thought I was in for a bout of pneumonia and so did my physician, for he examined my chest five times. Even morphia that night failed to ease the intense headache and I barely slept at all, perspiring periodically. Thursday was even worse, although the headache was easier all morning. I was sick several times and kept up an irregular fever. I was now convinced that I had meningitis, but on pointing out to the physician that my eyes were tender if touched he rushed off to get his ophthalmoscope, when being a mere surgeon I now thought I had a retrobulbar neuritis. That night was just as bad. By Friday morning I was past caring. My mouth was thick and dry and my lips were coated with sticky mucus. Having no neck rigidity I now diagnosed myself as influenza with encephalitis. My physician was still in the dark, but he arrived with great glee to say that a blood-count showed a leucopenia; therefore I must have influenza, unless of course it was typhoid or one of that lot. He re-examined me and with a shout of triumph announced I had "rose spots" but still had no palpable spleen. Not having had my bowels opened throughout he ordered me an enema. I strained all day and by the evening felt a little better if somewhat exhausted. My headache was easier but my rash, which did not itch at all, had become diffuse all over my trunk and looked like scarlet fever. I had a very white tongue but no sore throat and the rash did not involve my head and neck or limbs. A blood-culture was taken that afternoon. On Saturday morning I felt better still and only had a temperature of 99°, though the rash and headache persisted. The pathologist announced he had grown a gram-negative bacillus, which was supposed to clinch the diagnosis of a septicæmia of the coli-typhoid group—but it struck me that a mere 14 hours' incubation in ox-bile medium with blood that had been immunised months previously with TABT made it sound unlikely. Otherwise I must have a considerable infection or very potent bacilli. My father, also a doctor, was certain I was a typical atypical (he is Irish) case of scarlet fever. By Saturday evening I had a dusky irregular macular rash on all my limbs—not at all like "rose spots" but rather like measles. However tired I was in the evening I became peculiarly alert by night and found it almost impossible to sleep. Saturday night was no exception and I did not sleep at all, though I managed about 1½ hours after breakfast on Sunday morning. During that day my headache left me entirely, as did the rash on my trunk, though on my limbs it remained until nightfall and itched. The margins of my eyelids felt sore and I felt a strange kind of stiffness, almost a cramp, in my calves and thighs if I moved my legs at all. That night, helped by 10 grains of Medinal and an extremely comfortable Sorbo mattress supplied by the American Red Cross, I had a full night's sleep for the first time. On the Monday I awoke refreshed and enjoyed the pathologist's report that all subcultures had died out. The final proof had failed. Some "friends" suggested it must be *Bact. suipestifer* or swine fever! Next day I was normal in every way and felt darned peckish, so that on the Wednesday I was allowed up for an hour. On the Thursday, Friday and following Monday the pathologist cultured my stools and urine and found no pathogenic organisms. I was discharged on the 13th day after taking to my bed and on the 15th day from my first symptom. Later my Widal reaction taken on the 22nd day from my first symptom gave a weak double positive result:

	O	H
Bact. typhosum	1/25	1/50
Bact. paratyphosum A ..	—	1/10
Bact. paratyphosum B ..	1/25	1/50

No prizes are offered for the correct solution.

Miss T. MONTAGNON, who died on Oct. 27 at the Westminster Hospital, had been an inspector for the Ministry of Health since 1920. She was one of the first trained nurses to be appointed to the staff of the ministry and had done much to help public-assistance authorities to maintain a high standard of care for the old people and children in their institutions.

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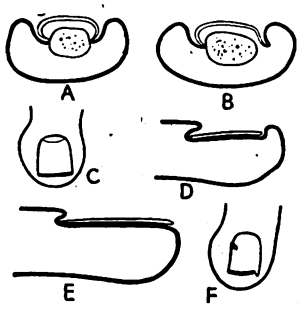
Letters to the Editor

INGROWING TOENAIL

SIR,—Before any further suggestions are made as to the cause of ingrowing toenail it might be well to ascertain the true shape of the big toenail. It is a laborious job to collect facts of such apparently trivial importance, but anyone who cares to investigate will discover that in some cases—I have no idea whether the proportion is small or great—the normal shape of the nail is as in (*a*), while the ingrowing nail is really a nail which grows *out into* the nail wall (*b*). Apart from any question of abnormality of the nail shape we have to remember that many people habitually cut the nail too short (*c*), so that the soft tissues grow to a higher level than the free edge of the nail and form a distal pseudo-wall (*d*). A well-cut nail extends to the end of the toe (*e*) and prevents the formation of this pseudo-wall. Finally, mistakes are often made in the cutting of the nail. The correct shape is a straight line and not curved as in the case of the fingers. When a toenail is cut with a curve it is easy to miss the corner—probably owing to the lateral curvature. This results in a spike (*f*) which, as the nail continues to grow, perforates the distal pseudo-wall. The sequence—wound, infection, inflammation, septic ingrowing toenail—is obvious.



Manchester. W. SAYLE CREER.

LIGATION OF THE PATENT DUCTUS ARTERIOSUS

SIR,—In their paper of Oct. 18 Dr. Bourne and his colleagues mention that two dangers of a patent ductus arteriosus lie in the mechanical effect on the circulation and the local supervention of infection, and they consider that ligation of the duct should be adopted as a therapeutic measure for the latter complication. There seem to be grounds for doubting the importance of these asseverations. Persistence of the ductus arteriosus may exist as the sole abnormality in about a quarter of the cases, and it may then cause no inconvenience, for the right ventricle merely hypertrophies in order to deal with the increased volume inflowing through the patent channel as a result of the higher aortic pressure. The sum total of change therefore in this type of case is that right ventricular development equals or exceeds that of the left and may be accounted as a physiological response to increased work and unlikely to give rise to mechanical strain on the circulation. In the majority of cases however the condition is associated with other congenital abnormalities, usually of an obstructive type, in the pulmonary or aortic circuits, and its presence is then of the utmost importance in permitting the establishment of a functional readjustment of the abnormal blood-flow. In such instances it is obvious that ligation of the ductus arteriosus would constitute a grave threat to the compensatory collateral circulation, a danger which is not lessened by the fact that the detection of additional congenital abnormalities may be very difficult. Thus it may be seen, in connexion with the first case, that the continuous murmur of ductal origin was replaced later by a rough systolic one in the pulmonary area, thereby indicating the unsuspected co-existence of a stenotic lesion. No doubt the lesion was of a minor character, yet the operation was followed by a severe though fortunately temporary uræmia and the incident serves well enough to illustrate what may happen in a more complicated type of case.

The connexion between endocarditis and patent ductus arteriosus is undoubted. Nevertheless, it may be questioned whether ligation can have any good effect either preventively or curatively, as the underlying predisposition to infection must be based on the anomaly of anatomical structure rather than irregular circulatory flow and the operation will not alter that factor. As a curative measure the value of the operation is still more problematical, since the vegetations in general are not limited to the ductus and the underlying structural defect in the wall of the pulmonary artery is not remedied. Indeed, the only practical accomplishment achieved would be a reduction in the number of systemic emboli, if these were present, to the ill vantage of the pulmonary circuit which would thereby receive the full complement. Recovery from infective endocarditis is not unknown, even before the days of sulphonamide treatment, and there is no means of ascertaining in the two cases described whether the operation in any way influenced the course of the disease as both patients were afebrile and on the road to recovery before it was carried out. It may be that there is a case for ligation of the patent ductus arteriosus; if there is, it would not appear to lie in that class of patients, comprising the majority, associated with other congenital cardiac defects or in any after the onset of infection. In the remainder, a logical indication for ligation might be as a prophylactic measure; but, in view of the natural repugnance of the healthy person to undergo "ideal" operations, particularly major ones, it is possible that opportunities to assess its real value will be few.

London, S.W.3. J. H. MULVANY.

CALCIUM STUDIES IN NORMAL PEOPLE

SIR,—I have been reading Dr. Robertson's articles with great interest. He quotes figures from balance experiments conducted on normal subjects which showed that below a certain level of Ca intake the Ca output was restricted—i.e., the Ca was used more economically. In the cases he quotes, the subjects had been on the low Ca intake for only short periods. We found the same in indigent subjects who had been on a low Ca intake for long periods (Owen, E. C., Irving, J. D. and Lyall, A. *Acta. med. scand.* 1940, **103**, 235). So efficient had the utilisation of Ca by these subjects become, that some of them were in equilibrium on intakes as low as 0·25 g. Ca per day. It would appear from this and other work (i.e., Rottensten, K. V. *Biochem. J.* 1938, **32**, 1285) that one cannot define a *normal* level of Ca intake in this way since the requirements for equilibrium will depend solely on the Ca reserves of the individual under test, and these in their turn depend on the previous dietary Ca history. This has recently been stressed by Steggerda and Mitchell (*J. Nutrit.* 1941, **21**, 577). Thus it has been found that Chinese (Kung, L. C. and Yeh, H. L. *Chin. J. Physiol.* 1937, **12**, 139) and negroes (Kelly, F. C. and Henderson, J. M. *J. Hyg. Camb.* 1930, **29**, 418) appear to have a lower requirement for Ca than do white people. This lower requirement is certainly not racial in origin but is due to the fact that these peoples habitually subsist at lower levels of Ca intake (Kung and Yeh). It therefore seems to me that one cannot quote figures for normal Ca requirements on the basis of balance experiments since the requirement for equilibrium depends entirely on the previous dietary history of the individual. The only assessment of adequate Ca intake must be an empirical one—one which keeps the individual in optimal health.

J. T. IRVING.

Department of Physiology, University of Cape Town.

"WAR-TIME HEALTH AND DEMOCRACY"

SIR,—May I take up two points in your generous review of my small book in THE LANCET of Nov. 1? Lord Hewart's definition of democracy is "a system of government based on the Rule of Law and the Sovereignty of Parliament": your reviewer has telescoped the sentence in my book which gave this definition, and the result is hardly fair to the distinguished author of "The New Despotism." Your reviewer gives one or two selected quotations to support his argument that I have "a somewhat introverted view of the doctor as a democrat." Two more quotations, if you will allow me to give them, cast doubt on your reviewer's interpretation: "My own opinion is that . . . the doctor, *in relation to his professional work*, should steer clear of politics." (Italics mine.) "And the individual doctor can always express his political views as a *private citizen* with the right to vote for his man in a free country." (Italics mine again.)

London, W.C.1. HUGH CLEGG.

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PLUMP TYPE OF GRAVES'S DISEASE

SIR,—In commenting on our paper of Sept. 20 Mr. Keynes makes the rather surprising statement that "it is dangerous to make any attempt to separate off any particular category [of Graves's disease] as being fundamentally different from the rest." Mr. Rundle in your issue of Oct. 25 appears to support this view. The cases we described had one distinctive character uncommon in Graves's disease—a tendency to increase in weight while still untreated and actively thyrotoxic. In addition they were all young women of about the same age with an unusual degree of lymphatic hypertrophy even for Graves's disease, and five out of eight had amenorrhœa. It seemed to us that these cases formed a distinctive group, though we admitted the existence of transitional types, and we suggested that they were displaying an unusual resistance to the thyrotoxic process. Since the results of thyroidectomy had not been so satisfactory as we had come to expect in the usual type of Graves's disease, we ventured to suggest that in such cases conservative treatment might be given a trial. We presume that it is this mild suggestion which has so alarmed Mr. Keynes.

Mr. Keynes has also made much of the two deaths in this group. We did not of course draw any far-reaching conclusions from these deaths; they were never a major point in our discussion on this group, and it will not surprise us if further experience shows the mortality to be not unduly high. None of the surviving cases, however, could be classed as good results, and three of them were early recurrences.

Later Mr. Keynes himself braves the dangers of subdivision sufficiently to admit the existence of "atypical" categories of Graves's disease, among which he classes the plump type. This surely is an odd method of classification, for he presumably groups together all cases which happen to lack one or more of the chief characters of the disease. We can see little in common, for instance, between the plump type (which are severe and outspoken examples of Graves's disease in young women) and the type common in the elderly in which auricular fibrillation is the only prominent feature of the disease. Yet Mr. Keynes would apparently class these groups together as "atypical" categories. Of this oddly assorted group, Mr. Keynes says that "there is room for judgment in forming an opinion for or against operation" because the results of thyroidectomy are less dramatic than in the classical type. Whether this is a correct statement of the prognosis of this remarkable hotch-potch it is impossible to say; but the statement is interesting as revealing that even Mr. Keynes considers the results of thyroidectomy to be not always exactly predictable. If this is so, is it so very dangerous to inquire whether there are not in fact different types of the disease, which may respond characteristically to treatment?

To avoid further confusion, the conclusions arrived at in our paper were the result of careful observation over a number of years of a series of cases of Graves's disease, operated on by the senior surgical staff at a general hospital. Mr. Rundle's reference to "a surgeon's early efforts at thyroidectomy" is therefore irrelevant.

W. R. TROTTER.
Leavesden. K. C. EDEN.

GRADUATION AT AN EARLIER AGE

SIR,—Many will agree with Dr. Spencer Paterson, who pleads for graduation at an earlier age in your issue of Oct. 25, when he states that the years from sixteen to eighteen are not very usefully employed. But surely the chief reasons are not, as he suggests, that students are either learning subjects which they must later re-learn at the university, or are learning classics; because, at the age of seventeen, the great majority are already working for their first M.B. Rather these years are not usefully employed because the work must conform strictly to a university syllabus which demands an unnecessary amount of detail, and does nothing to encourage a general or scientific background. Added to this, in many cases, are the unnatural restrictions to freedom and independence imposed at this stage by the public-school system.

To justify his plea Dr. Paterson also referred to the undesirability of late marriages and small families among the medical profession. This is found in the professional classes as a whole, and the reasons are largely economic. For this the state is responsible, and the state must find the cure, not the university or the medical authorities to whom the plea was directed. And let us note that the one state that has tackled this problem provides medical men, even in their student days, with an adequate salary. I cannot help feeling that the moral breakdowns in medical students which Dr. Paterson is apparently called on to treat may be due not so much to frustration with the medical curriculum, as to the realisation that at the age of twenty-one they are still, and for the next few years will remain, just as dependent on their parents for their every need as they always have been.

I submit, Sir, that our efforts would be better directed towards changes in the medical curriculum, and in the status of the young doctor, than towards graduation at an earlier age. Superficially this suggestion may appear as a panacea for the ills to which Dr. Paterson so rightly pointed. But perusal of your number (Aug. 30) devoted to medical education will show that in this country graduation probably takes place already at an earlier age than in any country in the world with the exception of Nazi Germany.

Watford. J. A. V. BATES,
Final-year student.

THE HEN AS MIDDLEMAN

SIR,—I welcome the criticism that appeared in your issue of Oct. 25 (p. 487) on my article in *Nature*, although the suggestion that, being an authority on poultry, I naturally defended the animal of my choice from the obloquy cast on it by agriculturists and dietitians is not too happily phrased, since the casual reader may assume that I wrote the article from reasons of self-interest rather than from the point of view of the welfare of the nation. In my article I contended that, on dietetic grounds, the egg is just as essential an article of diet as milk, and that, from the point of view of economy of conversion of feeding-stuff protein to human food protein, the hen has a claim to priority second only to the dairy cow. I assume that this dietetic part of my contention is accepted. But you attempt to destroy my case for the hen on economic grounds. Not being an economist I am at a disadvantage, but even to my amateur mind the arguments adduced appear a little unsound. To base an argument on the relative price the Government is prepared to pay for the protein in eggs and milk in these days of price regulation, and to argue that such prices reflect the relative efficiencies of the dairy cow and the hen to produce such protein is surely illogical, apart from the fact that I have never suggested that egg production should be encouraged at the expense of milk production. The present prices paid to the producer by the Government are admittedly fixed in relation to cost of production, but such costs cover many other factors than that of relative efficiency of food conversion. The relatively high prices paid for eggs are essentially due to the fact that Government action has resulted in poultry producers having to cut their flocks below the normal economic level, whereas no such action has been enforced in the case of the dairy farmer. The price argument works both ways. Following the same line of argument I could with equal justice maintain that the Government, by asking the consumer to pay 2½*d.* for an egg containing 6–7 g. of first-class protein, as compared with a pint of milk at 4½*d.* containing 18 g., is of the opinion that egg protein is much more valuable to the consumer, weight for weight, than milk protein.

The contention that the hen, being a much smaller animal than the dairy cow, requires much more energy for maintenance than the dairy cow, weight for weight, is an accepted fact, but even here there is a possible fallacy in the argument, since the relative cost of maintenance, when charged against the finished product, will vary according to the relative amounts of the finished product produced. It is of interest to note that a 5 lb. hen laying 140 eggs a year produces 78% of her body-weight in the form of dry human food (not counting shell), whereas the 1250 lb. cow giving 600 gallons of milk produces only 59% of her body-weight in the form of dry human food. Finally, although the energy requirement for maintenance is correlated with body surface rather

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than body-weight, such is not the case with protein. There is, consequently, no reason to assume that a small animal is less efficient as a converter of protein than a large animal.

I am not convinced that the reasoning in my *Nature* article is at fault. If need for protein is of primary importance to the nation, then the hen deserves first consideration next to the dairy cow. If, on the other hand, energy requirement is the primary need, then the pig should rank next to the dairy cow.

Animal Nutrition Institute, Cambridge. E. T. HALNAN.

CANCER AND OILING OF FLOORS

SIR,—As the suggested method of oiling floors has, I think, been in use at certain schools for very many years, without any detriment to the health of a few generations, it would appear that the method is harmless. One is thankful for assurance on the new suggestion of oiling blankets.

Market Drayton. PETER W. EDWARDS.

PROPHYLAXIS AND TREATMENT OF COLDS

SIR,—In his article of Nov. 1 (p. 534) Dr. Thrower mentions experments carried out for controlling colds by ultraviolet light and states that the results were disappointing. This is by no means the experience of observers who have used ultraviolet irradiation for many years in this and other countries. The common cold can be aborted in a large percentage of cases if proper technique is adopted and suitable apparatus is used. The nostrils and pharynx can be sterilised by application of ultraviolet rays by means of quartz applicators attached to the Kromayer mercury-vapour lamp first used in Berlin in 1903. This treatment should be combined with infrared irradiation applied over the antra and general U.V. irradiation to increase the bactericidal power of the blood-stream. Apparatus has unfortunately not been standardised in this country, the result being that innumerable pieces of apparatus now in use have but little therapeutic effect. In addition the technique adopted to carry out experimental investigations is often faulty.

Wimpole Street, W.1. W. ANNANDALE TROUP.

TOWARDS A NATIONAL SERVICE IN CLINICAL PATHOLOGY

SIR,—After reading Dr. Dyke's article of Oct. 25 doctors in general will be looking forward to the time when the scheme envisaged will have become an integral part of the practice of medicine in this country. It may, however, be of interest to Dr. Dyke and others to know that a comprehensive pathological service very much on the lines indicated has been functioning in at least one part of the country for many years, and that consequently one or two statements in this excellent article are not strictly correct.

More than a quarter of a century ago the Kent county council established a laboratory for carrying out public-health pathology. It soon became evident, however, that the line of demarcation between public-health pathology and clinical pathology was very indistinct, and it seemed desirable to extend the service to provide facilities for undertaking pathological work for all doctors practising in the county. The development of the scheme was very rapid, and even before the war nearly 100,000 specimens were being examined annually; about 30,000 in the six branch laboratories at the county hospitals and institutions and the remainder at the central laboratory at Maidstone. Briefly, the scheme as it operates at present is that medical officers of health, general practitioners and the medical staff of hospitals in the county which have no pathologist on the staff may send into the main laboratory an unlimited number of specimens for examination. Field work for the purpose of investigating and controlling the spread of epidemic disease is undertaken by the pathologists in collaboration with the district medical officers of health. In the case of patients residing within a reasonable distance of Maidstone, and who are able to travel, the doctors may wish to have specimens collected in the laboratory; in some cases, of course, this is necessary, and is greatly appreciated when such investigations as glucose-tolerance curves and urea-clearance tests are required. Furthermore, the services of pathologists are available to assist in consultation with doctors in the investigation of clinical problems at the bedside of their patients. These services are entirely free of charge to the doctor and the patient; outfits for the transmission of specimens are also supplied free, and the only expense incurred is that of sending the specimens to the laboratory. The cost of the laboratory is a charge on the county rate and is relatively small for the services provided.

It is not claimed that this pathological service is by any means ideal, and plans for future developments along present lines have been made; but that there is ample need for such a service is evidenced by the general appreciation expressed of the value of the provisions already made in this county.

Maidstone. CONSTANT PONDER.

FIRST-AID IN WAR-TIME

SIR,—I was interested to read Dr. Hodgson's letter in your issue of Oct. 25. During the past year the Halifax casualty services have been instructed with special reference to: shock; hæmorrhage; wounds; burns; certain fractures; war-time neuroses; the speedy evacuation of casualties; the diagnosis as between F.A. post and hospital casualties; and the movement, parking and spacing of casualty vehicles. In addition, a thorough knowledge of local geography (helped by night exercises) is part of their curriculum. We have cut out all elaborate bandaging and splinting at incidents. Tourniquet dangers are stressed. I am of the opinion that a simple textbook on war-time first-aid would be appreciated by the casualty services.

G. C. F. ROE,
Medical Officer of Health, Halifax.

Q CAMP

SIR,—In your review of W. D. Wills's book "The Hawkspur Experiment" (Oct. 18, p. 474) the principles on which the Q Camp was run are summarised in a way which shows a deep understanding of our work, but there is one correction I should like to make. The numbers never reached 70, nor could we have carried on the methods with so many at a time. We considered about 30 to be a desirable maximum, although had the demand been pressing we might have been willing to exceed this, but certainly not to go beyond 50. This does not imply that Q Camp methods are unsuitable for such institutions as Borstals or prisons, where large groups are at present the rule. Rather does it mean that large groups are unsuitable for the reformative work they aim to do. The combination of individual study and individual help with experiments in community living, which seems to be the lines most hopeful for the re-education of offenders, requires that these larger groups be subdivided.

MARJORIE E. FRANKLIN,
Oxford. Hon. Secretary, Q Camps.

HOME GUARD TERMINOLOGY

SIR,—We are discussing what title should be given to the minor aid-posts set up by the Home Guard and provided by the authorities with a minimal equipment. I am told that in one area these posts, which do not differ in any essential, are to have no less than three sets of initials according to whether they are associated with battalion headquarters, companies or platoons. The initials proposed are H.G. B.A.P., H.G. C.A.P. and H.G. P.A.P. The prefix H.G. is necessary because the army authorities already use C.A.P. and P.A.P., as was pointed out by one of your correspondents.

Surely it is time that we called a halt to this multiplicity of initials and gave first place to brevity and accurate description. Our Home Guard posts would be called points by the civil authority and by this term they intend to signify that the amount of assistance which can there be given is very much less than that provided at any post. The word point is not felicitous because the initial "P" may equally stand for post or party but it does at least indicate an important distinction which is missed by those who would use the expression aid-post for every sort of place at which medical attention is available. I must admit considerable sympathy with those who use the expression C.C.P. (casualty collecting post) as both descriptive and distinguishing for all Home Guard posts and would venture to hope that official authority may be given for the use of this term before a riot of uneasy nomenclature submerges us.

BATTALION M.O.

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WAR-TIME NURSERIES DISCUSSED

A STRANGE situation has arisen: everyone agrees that if women are to go into industry in large numbers their children below school age must be cared for, preferably in nursery schools and day nurseries; the Government has endorsed this view so strongly that local authorities can claim the entire cost of starting nurseries; and yet, after two years of war, there are at present only 163 day nurseries in the whole country, receiving between them barely 6000 children—and there are more children than that between 2 and 5 in many a county borough. Reasons for this curious inertia were discussed at a conference on Oct. 29, arranged for London and the Home Counties by the Nursery School Association of Great Britain and the National Society of Day Nurseries, with Lord Horder presiding. Administrative control has been given to the Ministry of Health; and, though approval of every new scheme for a nursery must be obtained from the Board of Education as well as the Ministry, power to give such approval has been delegated to the senior regional officers and to inspectors of schools, and arrangements have been made so that both approvals can be obtained at the same time. Difficulties in finding premises, staff and equipment are the chief delaying factors, but there are also wide divergencies in the enthusiasm with which local authorities approach the idea of establishing nurseries.

Mr. J. C. WRIGLEY (Ministry of Health) reminded the conference that in the early days of the war the need for nursery schools or residential nurseries had been mainly in the reception areas; now the need was chiefly in centres of industry where women were being increasingly employed. He suggested that whenever a nursery was planned local authorities should draw up a time-table fixing the dates on which the nursery should be approved, equipped and opened, and should make someone responsible for seeing that this time-table was kept. This dovetailed with a suggestion from Lady ALLEN OF HURTWOOD, one of the chief movers of the conference, that the Ministry of Health should appoint some dynamic person to apply ministerial policy and coördinate the departments, authorities and groups concerned with the needs of the young child. She felt that nurseries for babies under 2 should be established only with the greatest reluctance. She was doubtless thinking of the dangers of infection, so great among children of this age when they are gathered together; it is well to hesitate, especially if they are to be housed in the same nurseries as the 2–5 group. On the other hand it is not feasible to establish separate nurseries for those under 2. The mother with a sizeable family cannot be expected to get the bigger ones ready for school and then go round disposing of the younger ones at two different nurseries before she goes to work at 8 o'clock. Miss FLORENCE HORSBRUGH, parliamentary secretary to the Ministry of Health, said that in the ordinary way it was questionable whether the mothers with babies under 2 should be going to work at all, but just now mothers could look after their children best by making munitions to defend them. But she was not wedded to the notion that the only way to get the children looked after was in nurseries. A nursery, she pointed out, would take about 40 children; if something like 400,000 women with children under 5 were going into industry during the next few months we should need 10,000 nurseries straight away. It was impracticable to establish them on that scale, and she felt we must call upon a home guard of women—grannies and aunts—to do some of the minding while the younger women went into the factories. This laid Miss Horsbrugh open to the charge of being "minder-minded." Many people feel that there are strong objections, in the usual way, to this haphazard method of child care, and that nurture is best ensured in the nursery school. Yet it is doubtful whether finality lies on either side of this fence; MARGUERITE DOBBING, in a letter in the *New Statesman* of Nov. 1, tells of her own complete conversion from one opinion to the opposite after working in an evacuated residential nursery school for 21 months. The children there in spite of expert care seem to be going backward instead of forward, reverting to thumbsucking and temper displays; and this is due, she thinks, to lack of personal love. The aunt and granny could possibly achieve more in this direction than the best nursery school, however far they fell short in other ways.

This was borne out to some extent by the remarks of Miss ANNA FREUD at the conference. Nursery schools, she said, had never been meant as a substitute for the home, any more than the welfare clinics did away with the need for the mother's care, or child-guidance clinics with the need for education by the parents. All these services were simply extensions of the home. At present, however, families are dissolved, homes hardly recognisable and children scattered in billets. The nursery schools are confronted with the task of filling all the gaps, and they have done their best. But the mother-child relationship is normally a 24-hour affair, and the child who goes back and forth between home and nursery may in the end feel a stranger in both. Miss Freud believed in making every possible effort to include the real mothers in the life of the nursery. Some people, she felt, looked on love from the parents as a luxury which a child could not expect to get in war-time. In the last war the same remark was applied to things like sugar, fresh fruit and butter, of which continental children were deprived; these were now recognised as necessities. Today psychologists knew that there were some types of maladjustment in later life which were rooted in the lack of an ordinary home life in the first five years.

THE RIGHT STAFF

Miss FREDA HAWTREY made constructive proposals for dealing with the time lag in the development of nurseries due to lack of staff. The two types of women called on to fill responsible posts, as she pointed out, are hospital nurses and nursery school teachers. They have had totally different types of training and are therefore good at different things. Thus the nurse is (regrettably) used to residence and long hours. She is accustomed to handling babies under 2, to routine, to preventive measures against infection, and to detecting signs of illness early; but she has usually dealt more with sick children than healthy ones. The nursery school teacher is used to handling large groups of young children, believes more in free activity than routine, and has her attention focused on health; but she takes no responsibility for children under 2. Thus a hospital nurse is more suited for charge of a nursery which admits children of all ages under 5 and a nursery school teacher for a nursery which takes children between 2 and 5. In all nurseries where there are more than 20 children between the ages of 2 and 5 a nursery school teacher can be added to the staff; but coöperation between the nurse in charge and the teacher is not always easy. To overcome this difficulty, induced by the differences in training, courses in child management are being arranged for nurses, Miss Hawtrey said, by the Royal College of Nursing and for nursery school teachers by the Board of Education. The audience did not rise as one woman—as might have been expected—and say "But why not courses for both together?" Surely no better opportunity could be wished for establishing an understanding between the two groups of workers; and clever teachers should be able to help each student to merge her professional bias in the aims of the job she is going to do.

Miss Hawtrey suggested that the few available trained women—whether nurses or teachers—should be put into the key posts, and that the minor posts should be filled by "nursery nurses" trained to look after children in private families, by auxiliary nursery assistants who might be recruited from among young mothers, nannies, friendly aliens and elderly women. These could register with the Women's Voluntary Service and take a short training course with the Child Care Reserve. She would like to see emergency training centres started in connexion with existing nurseries, and estimated that if 24 students each took a 6 weeks' course, one centre could provide nearly 200 nursery assistants in a year.

PAYMENT FOR CARE

The cost to the mother of leaving her child at a day nursery was not discussed at the meeting, but this may well have an important bearing on the extent to which the nurseries are used when they are set up. The standard charge suggested by the Ministry is 1*s.* a day for each child and though this is little enough in return for all the child enjoys it is a formidable sum for a woman who happens to be working 7 days a week in return for a wage ranging from £1 18*s.* to £2 10*s.* a week. Cases of hard-

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ship can be considered and if necessary the payment can be reduced; but women in industry might well be granted this relief free of charge. It would pay well as a national investment in healthy child life.

Obituary

RALPH MORTON CALDER

M.B. GLASG.; SURGEON LIEUTENANT, R.N.V.R.

THE death has been reported of Surgeon Lieutenant Ralph Calder, who was posted as "missing presumed killed" last August. He was born in 1913, the only child of Mrs. Janet Calder of Ayr, and educated at the Academy there. He graduated M.B. with commendation from Glasgow University in 1935. He held house-appointments at Ayr County Hospital and the Glasgow Royal Hospital for Sick Children, and he was Prof. T. K. Munro's last house-physician at the Glasgow Western Infirmary before his retirement. It was during this time that Calder first showed his aptitude for experimental work, though his one great desire was to be a physician. But he was persuaded for a time at least to study pathology, and after two voyages as ship's surgeon he was awarded in 1936 an M.R.C. scholarship in experimental pathology. He chose as his subject liver necrosis and cirrhosis and began work at the infirmary under Professor Blacklock, who has written of him:

"Calder was a stimulating laboratory colleague. He approached any difficult pathological problem with a critical mind, but his criticism was always constructive and he dearly loved planning experiments to solve it. These experiments, as his work on the liver proves, were always logical and were planned to have a bearing on the elucidation of disease in the human subject. He did not neglect the purely morbid anatomical side of pathology and in the little teaching which he did he could draw an admiring group of students around him while he explained the nature of the lesions present. Then from his clinical knowledge he would correlate in a most lucid manner the postmortem and clinical findings. His academic accomplishments were great for one of his years, yet he was always modest and helpful towards his less gifted brothers and respectful of his seniors, who foresaw a great career in store for him and by whom he will be greatly missed."

In 1938 Calder was awarded a Graham scholarship and he came to London to continue his work on the liver under Professor Cameron at University College. He later submitted the results of these investigations as his M.D. thesis. He had joined the R.N.V.R. at the beginning of 1938 and he was called up before the outbreak of war. For a year he carried out the routine work of a medical officer attached to a general hospital, till he was detailed to specialised research work. At his own request he was later posted to a ship and on this service met his death. His published work included a report of a case of cold allergy and a study of autoplastic splenic grafts. His opinions were clear and his criticisms penetrating, but if he had forthrightness he also had charm, and his friends will remember him as an interesting and stimulating companion with a wide knowledge of literature and a deep love for the music of Mozart and Handel.

GEORGE ALEXANDER COHEN

M.B. EDIN.

MANY who attended the court of the coroner for Eastern Middlesex during the last fifteen years will regret the death of Dr. George Cohen on Oct. 16 at the age of 71. Dr. Cohen who was born in Hull qualified in 1893 at Edinburgh University, and after postgraduate study at St. Bartholomew's and Dublin, he saw a good deal of service abroad as a ship's surgeon. He set up in general practice at Harringay in 1906 but forensic medicine was his real bent. He was called to the bar by the Middle Temple and in 1910 appointed coroner for the then central Middlesex district. In 1926 Mr. A. M. M. Forbes, coroner for the eastern division of the county, died, and the eastern division absorbed the central under Dr. Cohen. After the Coroner's (Amendment) Act 1926 became law, his jurisdiction was further widened by the accretion of the parishes of Edmonton, Southgate and Enfield. In his younger days he was a noted instructor in ambulance work and a captain in the Volunteer Brigade of the Middlesex Regiment. For over six years he represented the Tottenham-Harringay Division on the Middlesex county council, but he resigned on his appointment as coroner.

ROBERT WALLACE NESBITT

M.B. DUBL., F.R.C.P.I.; SURGEON COMMANDER, R.N.

Commander Robert Nesbitt, who lost his life through enemy action in September, began his medical career in 1912, when he entered Trinity College, Dublin, with distinction as a junior exhibitioner—a standard he maintained throughout his student days. In 1915 he joined the R.A.M.C. as a private, but was sent back the same year to complete his medical studies. He qualified L.Med. as quickly as possible and in 1918 joined the Navy as a temporary surgeon. After the war he elected to stay in the service, returning to Dublin to take his M.B. degree in 1923. He had a distinguished service record, holding the appointment of medical specialist at Haslar, Plymouth and Chatham. Much of his leisure was spent on postgraduate work and a careful study of the literature of his special interest—diseases of the chest. But he found time to write several plays, one of which was acted by the Dublin Abbey Theatre. He loved a good argument, and his friends enjoyed the charm, humour and eloquence with which he disposed of their points. A well-turned phrase or subtly expressed thought gave him intense pleasure, for he had the gentleness, sympathy and understanding of a poet.

Births, Marriages and Deaths

BIRTHS

BARBER.—On Oct. 30, at Dunmow, the wife of Dr. Geoffrey Barber—a son.

CALVERT.—On Oct. 31, at Barrington, Cambs, the wife of Dr. Henry Calvert—a daughter.

CAREY.—On Oct. 31, at Sherborne, Dorset, the wife of Surgeon Lieutenant Fraser Carey, R.N.V.R.—a son.

DAWSON.—On Oct. 22, at Oxford, the wife of Major J. R. Dawson, R.A.M.C.—a daughter.

GRANT.—On Oct. 30, at Farnham, the wife of Captain Russell Grant, R.A.M.C.—a son.

HELLIER.—On Oct. 21, the wife of Dr. F. F. Hellier, of Park Square, Leeds—a son.

RICHARDS.—On Oct. 30, at Sutton, the wife of Captain A. H. Mordaunt Richards, R.A.M.C.—a son.

SIDEY.—On Oct. 31, at Aberdeen, the wife of Surgeon Lieutenant J. D. Sidey, R.N.V.R.—a daughter.

DEATHS

COLLIE.—On Oct. 27, at Bournemouth, Frank Lang Collie, M.D. Aberd., aged 77.

MARTLEY.—On Nov. 2, Francis Charles Martley, M.D. Camb., F.R.C.P.I., D.P.H.

PENFOLD.—On Oct. 27, at Melbourne, William James Penfold, M.B. Edin., B.Hy. Durh., D.P.H., director of the Baker and Shaw Institute, Alfred Hospital, Melbourne.

PICTON PHILLIPS.—On Oct. 29, William Edward Picton Phillips, M.R.C.S., of Egerton Gardens, S.W.3.

TIDEY.—On Oct. 29, at Winchester, Stuart Alexander Tidey, M.D. Lond., M.R.C.P., aged 84.

WALKER.—On Oct. 30, at Guildford, John Morris Walker, M.B. Glasg.

WATSON.—On Oct. 25, Thomas Boswall Watson, M.D. Edin. late of Woldingham, Surrey.

WATSON.—On Nov. 1, Henry Allan Watson, M.B. Glasg., of Worcester, aged 70.

AMERICAN DOCTORS FOR BRITAIN.—Up to Sept. 4 the number of doctors in the United States who had applied to enrol in the R.A.M.C. was 230 (*J. Amer. med. Ass.* Sept. 13, 1941, p. 941). Of these 138 were unsuitable for various reasons; 42 of the remainder had actually received passports.

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Medical News

Royal College of Physicians of London

At a meeting of the college held on Oct. 30, with Sir Charles Wilson, the president, in the chair, Sir Wilson Jameson, Dr. J. C. Spence and Dr. W. A. Daley were elected councillors. The following were re-elected representatives of the college: Sir Adolphe Abrahams on the committee of management of the conjoint board; Sir Comyns Berkeley on the council of the Central Midwives Board; Dr. John Hay on the court of governors of Liverpool University; and Sir Stanley Woodwark on the Central Council for District Nursing. Dr. Cyril Elgood was elected a member of the library committee.

The president announced the appointment of Sir Wilson Jameson as Harveian orator, and Surgeon Captain Macdonald Critchley as Bradshaw Lecturer for 1942; and the award of the Jenks scholarship to Terence Robert Lancelot Finnegan, late of Epsom College.

The following having satisfied the censors' board were elected members:—

Margaret D. Baber, M.D. Lond., W. W. Brigden, M.B. Camb., H. A. Burt, M.B. Camb., D. L. Caldwell, M.B. Camb., G. W. M. Findlay, M.D. Edin., G. M. FitzGerald, M.B., N.U.I., Geoffrey Flavell, F.R.C.S., G. S. Graveson, M.B. Camb., Ursula James, M.B. Lond., Joseph Marks, M.B. Lond., Thomas Parkinson, M.D. Lond., F. T. G. Prunty, M.B. Camb., and I. B. Sneddon, M.B. Sheff., surgeon lieutenant, R.N.V.R.

Licences to practise were conferred upon the following 159 candidates (138 men and 21 women) who have passed the final examination of the conjoint board:—

Hasley Anderson, R. H. Andrews, I. J. Anrep, C. D. Baker, Hazem Barrada, Edward Barry-Smith, A. W. Bauer, Peter Baxter, Heinrich Beck, Marcel Bednar, C. J. A. Bell, J. A. R. Bickford, Margaret A. Billinghurst, D. A. Blacketer-Simmonds, Joseph Borrowdale, D. S. Boyle, S. V. Brookes, Jean L. Broughton, R. J. D. Browne, C. J. Bruhn, J. D. Bruzaud, Olive N. Bywaters, D. A. K. Carnegie, D. W. F. Charlton, W. H. Chase, J. P. Childs, N. F. Clarke, B. U. Coffey, H. I. Coombs, R. A. Craig, A. F. Crick, M. C. Cross, F. X. Darné, R. G. Dewhurst, L. W. D. Drabble, F. M. P. Eckstein, J. R. Ellis, Shifra Ernst, A. T. G. Evans, A. J. Evans, E. J. S. Evans, J. W. G. Evans, J. H. W. Fagan, T. N. Fison, J. M. Fitton, A. W. H. Foxell, Beryl M. Givan, E. C. E. Golden, Gertrude Goldscheider, J. G. Goodhart, A. J. R. Gottfried, J. D. C. Gowans, K. G. Green, B. P. Griffin, H. J. Hagger, C. L. Hall, Doris N. Hall, Constance M. Hallett, J. H. G. Halliday, Penelope K. Hammick, B. E. F. Hammond, P. A. S. Hargrove, Charles Harris, R. J. Harvey, Thomas Haw, Ursula M. Hickman, A. W. Hind, S. J. Hinds, W. K. G. H. L. Hoffmann, A. E. Howarth, D. R. Hughes, Isabella C. F. Hungerford, Menahem Icht, E. B. Jarrett, Rees Jenkins, C. H. Jones, D. G. Jones, K. C. D. Jones, Samuel Jung, F. L. King-Lewis, F. M. Lancaster, Richard Leigh, K. H. Lim, W. K. Lim, Jeffrey Lomas, J. D. B. Longley, Helen C. Longmore, Morris Lustigman, Osias Lustmann, P. M. McAllen, Hugh McColl, Gerald Machanik, L. R. McLaren, T. M. M. McLean, H. L. McMullen, George MacVicar, Mary B. Maish, Betty M. Margetts, Giusto Mariani, H. E. S. Marshall, S. M. Ma'tuk, C. H. Merry, J. E. Moore, J. E. E. Morgan, P. J. L. Mumford, J. W. Nelson, R. J. Newman, G. D. R. Patten, Jean W. Paul, Alfred Pearce, B. O. Pepper, R. K. Phillips, W. A. Porter, Elvira Power, T. M. Pritchard, J. P. Quilliam, J. F. P. Quinton, R. J. W. Rees, Edith Rhodes, J. W. F. Richardson, H. A. Ripman, J. T. Robinson, W. G. Roper, Israel Rosen, C. F. Ross, R. K. Ross, Hynek Rotenstein, D. T. Rowlands, D. K. Sambrook, Walter Schiller, G. C. Schwizer, H. P. Scurlock, C. F. Scurr, A. G. Seaman, J. P. Sharp, A. L. H. Smith, B. J. Smith, A. J. M. Stevenson, Maximilian Szinay, J. H. Tasker, H. D. Teare, D. I. Thomas, R. D. St. G. Tucker, K. O. A. Vickery, D. G. Vulliamy, Ellis Vure, G. H. Waddington, Glenys J. Wade, Vera B. Walker, G. G. Wallis, D. P. Walther, C. W. Walton, G. N. Weber, Joan M. Whiteman, David Williams, E. J. Williams, M. H. C. Williams, D. H. Wright, and E. J. Young-Thompson.

Diplomas in child health were granted, jointly with the Royal College of Surgeons, to the candidates named in our issue of Oct. 18 (p. 473), and diplomas in public health to L. C. Lodha, L. G. Norman and M. A. G. Ward.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council of the college held on Oct. 25, with Prof. W. Fletcher Shaw, the president, in the chair, the following were admitted to the membership:—

Gavin Boyd, Glasgow; Edward Gledhill, Batley; R. M. Millen, London; Constance E. Peaker, Leeds; Kathleen M. Robinson, London; Katharine C. Rogers, London; R. X. Sands, London; Violet E. A. Sykes, London; and George Wynn-Williams, London.

The following have satisfied the examiners for the diploma:

Elizabeth G. W. Barker, Constance L. Beynon, L. A. Cruttenden, Dorothy Cunningham, R. G. Denniss, A. A. Fyffe, R. P. Gammie, Jean L. Hallum, L. W. Hefferman, Geoffrey Hollingsworth, Hilda E. McNamara, P. S. Norris, Jean F. Thompson, H. B. Watson, Eva M. M. Willett, and H. G. Wolskel.

Association of Anæsthetists of Great Britain and Ireland

The following have been elected officers of this society for the coming year: president, Lieut.-Colonel Ashley Daly, R.A.M.C; vice-president, Dr. C. F. Hadfield; treasurer, Dr. Z. Mennell; and secretary, Dr. A. D. Marston.

National University of Ireland

The Dr. Coffey travelling studentship in physiology has been awarded to Dr. J. W. Harman and the bursary in medicine to Dr. John McSorley.

North Western Tuberculosis Society

A meeting of this society will be held on Thursday, Nov. 13, at 3 P.M., at 352, Oxford Road, Manchester. Dr. G. H. Leigh, the president, will speak on facts and fancies and the tuberculosis death-rate.

British Institute of Philosophy

On Friday, Nov. 14, at 3 P.M., Prof. Herbert Dingle, D.Sc., will speak at University Hall, 14 Gordon Square, London, W.C.1, on the universe in relation to modern physics. Cards of admission may be obtained from the director of studies at University Hall.

Royal Institution

On Tuesdays, Nov. 25, Dec. 2, 9 and 16, at 2.30 P.M. Prof. J. C. Drummond, D.Sc., will lecture on recent advances in the science of nutrition and their significance in war-time. The meetings will be held at the institution, 2, Albemarle Street, London, W.1.

Pharmaceutical Society of Great Britain

A meeting of this society will be held at 17, Bloomsbury Square, London, W.C.1, on Thursday, Nov. 13, at 2.30 P.M., when the Hanbury medal will be presented to Mr. Harold King, F.R.S., a member of the staff of the National Institute for Medical Research. Dr. King will afterwards speak on chemistry and pharmacy.

Royal Society of Medicine

On Tuesday, Nov. 11, at 2.30 P.M., there will be a discussion in the section of therapeutics and pharmacology on the kidney and hypertension. The openers will be Prof. Arthur Ellis, Dr. Clifford Wilson, Prof. G. W. Pickering and Dr. Robert Platt. The clinical section will meet at St. Mary's Hospital, Paddington, at 2.15 P.M., on Nov 14. At 3.30 P.M. on the same day Prof. A. J. Ballantyne will read a paper on angiomatosis of the retina to the section of ophthalmology. The section of neurology will hold a clinical and pathological meeting on Nov. 15, at 10.30 A.M., at Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

L.C.C. Vitamin Tests

The London County Council has arranged for tests on the effect of American vitamin capsules to be carried out on 500 elementary school-children, subject to the consent of their parents. One vitamin capsule a day will be given on five days a week for nine months to 125 children selected at random in a reception area and to 300–400 children similarly selected from those attending elementary school in London. An equal number of children will be chosen as controls who will be given capsules with a harmless inactive content.

Hostels for Old Age Pensioners

At a meeting of the old people's welfare committee of the National Council of Social Welfare on Oct. 31, Lord Soulbury, chairman of the Assistance Board, announced that where pensioners did not need continuous medical attention or nursing but needed to have such care at hand the board would make their pension sufficient to enable voluntary organisations to maintain hostels for them. To this end the supplementary pension would be made sufficient to provide the pensioner with an income of 30*s.* a week.

Medical Aid for China

During their second year's work the China Medical Aid Committee were able to send Dr. Kent, an Austrian surgeon, and Dr. Coutelle, a German physician and physiologist, to China and in November, 1940, they were posted to Red Cross units in Hunan-Hupeh areas. Dr. Rosa Coutelle and Mrs. Maria Kent, a trained nurse, set out to join their husbands in March but owing to enemy action had to return to England. There are now nineteen foreign doctors working in the Red Cross units under Dr. Lim. The units consist of a few trained Chinese first-aid workers and an interpreter. The doctors treat the sick and wounded, perform simple operations, treat fractures, teach hygiene and sanitation, and sort out the wounded to be sent to the base hospital 200 miles away. The press appeal made by the committee in July (*Lancet*, July 5, p. 24) raised £400 and further donations will be welcomed by the treasurer, Dr. E. H. T. Hambly, Treharrock, Seer Green, Bucks.

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Prisoners of War

W.S./Captain J. B. Sherman, M.B. Melb., R.A.M.C., and W.S./Captain I. R. I. MacDonald, M.B. Edin., R.A.M.C., have been posted as prisoners of war.

Paddington Medical Society

A meeting of this society will be held at 3.45 P.M., on Nov. 11, at St. Mary's Hospital, when there will be a discussion on how to solve the night-call problem in London.

Chadwick Lecture

Mr. Frederick Hiorns, F.R.I.B.A., will give a Chadwick lecture on Tuesday, Nov. 11, at 2.30 P.M., at the London School of Hygiene, Keppel Street, W.C.1. He will speak on hygiene technique in building, or the economic, psychological and health aspects of surface treatment.

Royal Faculty of Physicians and Surgeons of Glasgow

At the annual meeting of the faculty the following were elected office-bearers for the ensuing year:—president, Mr. Roy Young; visitor, Mr. James MacDonald; treasurer, Mr. William Richard; librarian, Dr. W. R. Snodgrass; other councillors: Mr. J. Scouler Buchanan, Mr. Donald Duff, Dr. John Gardner, Dr. Stanley Graham, Dr. John Henderson, Mr. J. A. C. Macewen, Dr. Donald McIntyre, Dr. Noah Morris, Mr. William A. Sewell, and Mr. J. Forbes Webster.

Alliance of Hospital Administrators

The councils of the Incorporated Association of Hospital Officers (which has hitherto limited its membership to the administrative staffs of voluntary hospitals) and the Incorporated Association of Clerks and Stewards of Mental Hospitals have recommended the fusion of their societies. The new body will open its membership to administrative officers of local-authority and other hospitals, and a committee will be set up to consider the recruitment and training of administrative hospital staff.

Notes, Comments and Abstracts

TO RADIUM SMALLHOLDERS

IN addition to the radium held by hospitals under arrangement with the Radium Commission and King Edward's Hospital Fund there is an appreciable amount in the possession of small hospitals, medical practitioners and commercial firms, and the Minister of Health has now issued a pamphlet instructing these users how to protect their supplies. All radium exceeding 1 mg. in amount should, when not in use, be kept in a bore-hole or steel container of an approved type described in the pamphlet. The bore-hole advised is 50 ft. deep, and otherwise similar to that lately described by Lederman and Mayneord (*Lancet*, 1941, 2, 461). The container consists of a round or square block of mild steel with a narrow opening leading to a cavity in the centre to hold the radium. The opening is closed by a screw plug. The walls of the container must be not less than 3 in. thick. In a hospital in a vulnerable area not more than 350 mg. should be in use at any one time. Radon should be used instead of radium where possible and the treatment of patients by radium should not continue during an air-raid unless they are in a shelter. If a bomb falls where radium is known to be, the medical officer of health should be at once informed. He will have the area roped off and notify the Ministry of Health, who will arrange for experts to examine the site.

SALAZOPYRIN IN RHEUMATISM

GOOD results are reported by Svartz,[1] in Stockholm, from the use of a compound of sulphapyridine and salicylic acid in rheumatism. She had previously found that though sulphonamides alone were sometimes valuable in septic arthritis they had no effect on the ordinary rheumatic case, but it seemed possible that they might render the responsible organism more sensitive to the action of salicylates. Simultaneous medication with sulphonamides and salicylates was therefore tried, but without effect. Finally, however, Askelöf and Willstædt prepared salicylazosulphapyridine, a preparation which is now produced commercially by Pharmacia of Stockholm under the name Salazopyrin. Svartz reports five cases of rheumatic polyarthritis successfully treated with this drug. One woman of 33 had had polyarthritis since 1933 and when seen could only walk a few steps with difficulty; salazopyrin, 0·5 g. four times daily, was begun on Oct. 29, 1940; by Jan. 31, 1941, movements were almost normal and the patient felt well. Another woman of 44 with arthritis of 1½ years' standing, chiefly affecting the knees and metacarpals, was given several courses of salazopyrin amounting in all to 900 tablets of 0·5 g. each. This lady found herself standing on a chair energetically chasing a moth. The other cases reported are similar, except that one developed a toxic rash after treatment for 10 days with 1 g. six times daily. Svartz also reports four cases of ulcerative colitis in which administration of the drug was followed by complete remission of symptoms. Salazopyrin is only slightly soluble in water, but its alkaline salts dissolve fairly well. Part of it is excreted unchanged in the urine, causing an orange discoloration if the urine is alkaline. It does not give immediate relief of rheumatic pain and it may therefore be necessary to give salicylates with it. The dose recommended for adults is 1 g. four to six times daily, and treatment can be continued for weeks or months. The blood picture should be watched, since mild anæmia was seen in some patients; no serious toxic effects were noted, though the drug had sometimes to be withheld for a time because of a rash.

1. Svartz, N. *Nord. Med.* 1941, 9, 554; *Ibid*, 1941, 11, 2261.

BOOKS FROM THE ARGENTINE

IN their new volume on primary malignant tumours of the bronchi and lungs (Buenos Aires: Hachette. Pp. 401), which is the only modern book written in Spanish on this subject, Prof. Julio Palacio and Prof. Egidio Mazzei describe three new clinical pictures associated with pulmonary growths: the osteo-arthropathic, in which hypertrophic osteo-arthropathy is the characteristic sign; the pseudocardiac which produces symptoms resembling angina pectoris, paroxysmal tachycardia or cardiac insufficiency; and a type in which Klumpke-Dejerine paralysis gives a valuable pointer in the diagnosis of carcinoma of the apex of the lungs. Several years ago the authors were awarded the Alvarenga prize of the Paris Academy of Medicine for their work on atelectasis of the lung, and in discussing atelectasis caused by bronchial carcinoma they draw attention to two new signs which they have observed: deviation of the trachea (palpable in the suprasternal notch) during inspiration, in cases of atelectasis of the superior lobe; and the radiological finding of an unusual degree of translucency in the lung adjoining the atelectic lobe.

In his book "Las Neurosis en la Guerra" (Buenos Aires: Aniceto López. Pp. 251) Prof. Gregorio Bermann discusses the place of psychology, psychiatry and psychotherapy in the treatment of people affected by war conditions. During the Spanish civil war Professor Bermann was chief of the section of neurology and psychiatry at the military hospital at Madrid and his book is based on his own clinical experience. Prof. Emilio Mira, who spent some months at the Maudsley before taking up a post in South America, has written a foreword to the book.

WARNER'S CALENDAR OF MEDICAL HISTORY.—Messrs. William R. Warner & Co. did not expect to be able to print further editions of their diary during the war; but they have obtained the authorisation of the paper control to publish a limited number—less than half of last year's edition. The calendar is available only to members of the medical profession, and any doctor who is a regular user or who would like a copy for 1942 should write at once to Messrs. Warner, Power Road, London, W.14.

THE fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Appointments

BOND, K. E., M.B. Camb., F.R.C.S.: temp. surgeon to outpatients at the Hampstead General and North-West London Hospital.

MORLEY, H. S., M.D. Lond., M.R.C.P.: examining factory surgeon for Midhurst, Sussex.

PARKER, ALEXANDRIN, M.B. Edin., D.T.M. & H.: R.M.O. at the East End Maternity Hospital, London.

THOMAS, C. L., M.D. Toronto: R.S.O. at Booth Hall Hospital for Children, Manchester.

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ORIGINAL ARTICLES

MEDICINE AND DUTY *

T. B. LAYTON, D.S.O., M.S. LOND.
SURGEON TO THE THROAT AND EAR DEPARTMENT OF GUY'S HOSPITAL; OTOLOGIST TO THE FEVER SERVICE OF THE L.C.C.

THE influence of Nelson's order of the day at Trafalgar has come down to us through more than a century. Its various manifestations affect our profession: there is the duty of the one and of the many; the duty of the immediate emergency and of the never-ending routine.

When a boy and a girl sign on at a medical school they join a profession in which they can no longer call any minute of their future lives their own. At any moment they may have to give up whatever they are doing to go and see someone in distress; that is one of the glories of our profession. If that distress is grave the doctor may have to collect a team to take action or to hand the patient over to a team which is in readiness. These are the aspects of duty in acute disease; and once one is inured it is not very hard to rise to them. It is no disparagement of the heroes of Trafalgar to say the same of their response to Nelson's signal, when everyone was on tip-toe for a fight. Far harder were the two years before Toulon when duty consisted in seeing that every day every rope and every spar was in its place, and when, for many, that was the whole of duty. In the same way we have with chronic disease a communal duty, made up of the personal duty of the many. Preventive and social medicine are developing around us. Our communal duty is not analogous to the work of a gun-team in the *Victory*, or even to that of her whole ship's company, but rather is comparable with the teamwork of the whole fleet. We have our firms at Guy's, the success of each depending on the sense of responsibility and duty of each member of it. But often one firm needs the assistance of another, and we have not yet replaced the enthusiastic emulation of competing firms by an equally enthusiastic fusion of firms working together. We must do this, and in such a way that for one patient a medical firm may fuse with an orthopædic firm, for another with an ear firm, while for a third all three or more may be needed; and we must see that the patient does not fall between two stools and that there is the same individual attention as there was when the patient was entirely under one man. Extend that idea to a similar fusion between different institutions, so that a patient may be at the same time under the care of someone at Guy's and someone else at an L.C.C. hospital nearby and perhaps under others at an L.C.C. hospital in the country or at 'Guy's-in-the-country, and under still more at a convalescent home or a rehabilitation centre belonging to a regional scheme. At present this idea that each of us should work for his patient in a medical world which includes several institutions is little developed; but we have to build a new code and a new etiquette between institutions.

DESTINY AND THE MIDDLE EAR

I want to try to illustrate these considerations by discussing the inflammations of the middle-ear cleft which I believe form today our most important medical problem from the national point of view. I know that I am suspect in making such a statement, for they have been my daily task between the wars. First there are cases of acute inflammation of the previously undamaged middle-ear cleft, most of which get well by the processes of nature. But a small number demand immediate action by the emergency team and are just as urgent as the most fulminating form of appendicitis; and as with appendicitis the final decision depends on the correct appreciation of a single physical sign. Rigidity of the neck is to otitic meningitis of acute disease what rigidity in the abdomen is to commencing peritonitis; and this neck-rigidity may be as difficult to assess as that in the right iliac fossa. One thing is certain: when you see a discharging ear and a suspicion of rigidity of the neck it is your duty to see that, to quote Wilfred Trotter, "the patient should at the earliest possible moment be put in conditions where any operation that may become necessary can be most safely and quickly performed."

The death of a child is a tragedy; but from the national standpoint it is not merely the fact of death that matters, but the influence which this has on the lives of others. When a father or a mother dies and leaves children destitute, the results are more far-reaching than when one of the children is taken away; and this is what happens when an intracranial complication of chronic ear disease arises, for they arise in middle age. Every one of these cases is a drama; sometimes it has a happy ending and then we keep in touch with the patient for several years, greeting him with pride, knowing he would not be there if it had not been for us. Sometimes it is a tragedy and our part ends in the post-mortem room, examining the intracranial contents to see what we can do in the next case to ensure that it may take a different course. The tension of a week's wasted work dies down and leaves us in that state of mental collapse which leads us to push the whole matter out of our minds. But it is only the end of the third act of tragedy for the family, left either without its wage-earner or without the mother. We all hope to start our children in life where we left off; we are beginning to wonder whether this is a wise wish, but there it is. With the extinction of the wage-earner that hope is gone. The mother has to take his place and the general standard of living goes down, in many instances, to one in which nutrition and even decency are impaired. When the mother dies it is worse; the loss of that life takes effect unto the third and fourth generation. These cases put the inflammation of the middle-ear cleft in the forefront of medical problems of national importance, because they are a group of tragedies which could have been prevented—and which should be prevented in the future.

Other results affecting the national weal follow failure to cure an acute inflammation of the middle-ear cleft. An infant begins to learn by the sense of feel; then the sense of sight is brought into play. When he learns to walk he passes out of infancy, and education may be said to begin. In the early stages of education hearing is the master sense; he needs it to learn to speak and to pick up scraps of knowledge from those around. I do not think that the importance of this stage of a child's education is sufficiently realised. If there has been some hardness of hearing he may be so backward as to lead to a suspicion of mental deficiency. One of the most difficult examinations in clinical medicine is to test the hearing at this age and to decide whether there is any deafness; but I consider that hardness of hearing which we can hardly call deafness is of serious consequence to the developing mind up to the age when a child can read, and read freely. Thus every acute inflammation of the middle-ear cleft if it is not cured before it changes to chronic disease or before there is permanent damage to the middle ear, may alter the whole of the patient's life.

An elaborate organisation has been set up by the Board of Education over the whole country, under the Children's Act of 1906, to deal with chronic ear disease in children of school age. Doctors, nurses, teachers, and many other people have given their attention to this work; and nothing has come of it in thirty years. That is what we have to face: chronic ear disease is incurable. It can be prevented by curing the preceding acute inflammation; but once the cutaneous or other secondary organisms have become established the disease is in most cases incurable. Many will say I am wrong. But though they may have helped many cases of chronic otitis media to get well, these are very few compared with the number of the population going about with chronic ear disease. We must approach the problem from a new aspect. Let us consider how chronic ear disease affects life after the school age has been reached. We may divide it into the effect on education and the effect on the wage-earning capacity. For the seriously deaf child there are special schools with expert teachers, or arrangements are made for the child to sit in front of the class near the teacher. But these form but a small part of the problem. It is the children with an unassessable diminution of hearing, or with deafness

* A lecture given on the eve of Trafalgar day, 1941, at Guy's Hospital.

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not serious enough to warrant special arrangements, that waste the nation's energy, because they are not gaining as much from their education as they should. They go out into the world less expert than they should be, whatever their work, because their mental processes are not developed as much as they might have been.

The effect on wage-earning capacity is more uncertain. I do not believe that mere discharge from an ear ever results in a person losing work, having to take work of a lower standard, or having to go off duty. Once the patient has learned how to make a proper toilet of the meatus none of these things will happen; the only reason for his drawing sickness benefit is his doctor's suggestion that he should. There is no reason why anyone should stop work or be admitted to hospital on account of ear discharge without any other symptom. With deafness the problem is more intricate. Once a person is in work he does not lose work because of it. But a deaf man finds great difficulty in getting posts and in holding them; and he is often driven to do poorly paid menial work below the level for which his mental faculties qualify him. But the process does not necessarily end there; he may be driven down into the ranks of the unemployed, from whom come the unemployable. This national problem will in the future become more important because the effect of deafness, or even of hardness of hearing, is much greater in the woman than in the man. There are many jobs a man can continue to do with little or no hearing, but very few in which a woman can retain her post.

We must look, then, on every case of acute inflammation of the middle-ear cleft that becomes chronic as a failure, not for any given doctor but for the medical profession as a whole. It is not a matter for specialists, it is one of those bits of medicine common to the whole profession. We must all try to realise that if we have under us a patient with an acute inflammation of the middle-ear cleft we have a short six weeks in which to get it well from the date on which the drum-head ruptures; and by well I mean with a healed drum and normal hearing. We must use that combination of preventive and social clinical medicine of which I spoke earlier, and it will need the teamwork of the whole fleet. But no-one will see the results of his own work; what we do today will take effect in A.D. 2000.

EPIDEMIC NEONATAL DIARRHŒA IN MATERNITY HOSPITALS

I.—CLINICAL ASPECT

GEORGE ORMISTON, M.D. EDIN., M.R.C.P.E.

(*Working for the Medical Research Council, London*)

SERIOUS outbreaks of diarrhœa among babies in maternity hospitals have been described of recent years. Excellent accounts of their epidemiological and clinical features have appeared in America (Barenberg et al. 1937,* Frant and Abramson 1937, Rice et al. 1937, Best 1938), where attention has been drawn to their widespread distribution, high morbidity and mortality, and unexplained ætiology. Apart, however, from a paper by Craig (1936) little has appeared to indicate the prevalence of neonatal disease of an epidemic character in this country. The purpose of this communication is to summarise the results of studies into the nature of three of these outbreaks in different cities in England during the latter half of 1940.

These epidemics, which are sometimes referred to as epidemic diarrhœa of the newborn, are probably more common than is generally realised. Because of their tendency to high morbidity and mortality it is important that their features should be recognised as early as possible. We hope that the present account will lead to their more frequent recognition.

The cause or causes of diarrhœa in the neonatal period have not been satisfactorily established, and the opportunity has been taken to pursue certain bacteriological investigations which will be described in a later section of this paper. The outbreaks will be labelled respectively A, B and C. A and B affected hospitals in widely separated cities in the south of England, and C a hospital in a large city in the industrial north.

OUTBREAK A

This occurred in a voluntary lying-in hospital of between 50 and 60 beds. The building is comparatively old and has 5 public wards and 7 small private rooms. There are 10 beds and 10 cots to a ward. There is a single labour room situated between the babies' bathroom and a distributing kitchen. The babies are washed, changed and fed (if not on the breast) in the bathroom. This leads to much contact between them. The hospital is understaffed. There is no division of duties, so that the same nurse attends the mother and feeds, changes and washes the infant. Breast-feeding is the rule, but, when cow's milk is necessary, a pasteurised product is used, suitably diluted, and acidified with lactic acid. It is stored in a refrigerator in a special milk room. Glucose water is given to all babies.

The first baby became ill on May 10, 1940, with sudden loss of weight, severe diarrhœa and some vomiting, and exhibited other symptoms such as drowsiness, dehydration, elevated temperature, a toxic appearance and a hoarse cry. Thenceforth, cases of varying severity appeared every few days through June into July. All the wards and all the babies in the private rooms were affected, and though measures were taken to check it the outbreak persisted until the hospital was closed to further admissions.

Period of epidemic prevalence (May 2–July 20, 1940)	
Babies born during this period	250
Babies who exhibited symptoms in hospital .. (10 came under our observation.)	27
Deaths from neonatal diarrhœa in hospital .. (Deaths at home are not accounted for.)	5

OUTBREAK B

This concerned the maternity department of a municipal hospital serving a large city about 130 miles from A. The department is of modern construction, and was opened in 1939. It consists of two identical one-storied buildings separated by a grass plot and with no indoor communication. Each comprises two wings joined together in a wide V facing roughly south. Each wing is subdivided into 11 single or double rooms and 2 small wards of 3 beds. The total number of beds in the department amounts to 88.

By contrast with A, the babies sleep together in a large central nursery, and here they are changed and fed if not on the breast. A bathroom and an isolation room adjoin the nursery. Cots are placed side by side on the framework of a movable trolley which is wheeled along the passage to the respective rooms at feeding time. The artificial foods in use include pasteurised milk, Nestlé's, Trufood and Allenbury's. These are kept in the cupboard of a kitchen used for food distribution to the mothers, and there is no refrigerator. Glucose water is given to all babies. Here again the nurses share the duties of attending to mother and child. Each wing has its own labour-room and a separate personnel. A swing door in the passage between the wings can be closed to ensure the mechanical isolation of one wing from another.

When the outbreak came under our notice it appeared to be confined to one wing, where the first diagnosed case occurred on July 7, 1940, and the last on July 27. Out of 42 babies exposed, 14 became ill in hospital at intervals of a day or two; a follow-up inquiry revealed that an additional 12 babies developed the disease within a few days of reaching home and must have been discharged during the period of incubation.

Months later unmistakable cases were recognised in both wings of the twin block. The evidence suggests that the outbreak really began about the middle of June and ran without intermission in one wing or another until it was checked in December. Many deaths occurred, and though all the cases had pronounced gastro-intestinal symptoms, the stated cause of death was rarely connected with or attributed to them. The closing of a block about the third week of November appears to have stopped the outbreak.

Period of epidemic prevalence (June 17–Dec. 15, 1940)	
Babies born during this period	540
Minimum number of babies affected in hospital (25 came under our observation.)	83
Deaths from neonatal diarrhœa in hospital ..	25

* References will be found at the end of the second paper.

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OUTBREAK C

This outbreak took place in the modern section of an older hospital serving a large industrial population. Unfortunately we did not hear about it until it was over, so that there was no opportunity of studying it at first hand. The maternity unit comprises 4 wards of 6–12 beds each, and 5 single or double rooms, distributed on two floors. The ground floor has its own labour-room, and in addition an isolation unit and nursery. The first floor takes the larger number of patients, has 2 labour-rooms, an operating-theatre and 2 nurseries, one of them for premature babies. The total number of beds is 43.

Between July 2 and Sept. 29, 1940, 29 babies became ill in hospital, most of them in July and August. Many of the cases were severe, and the fatality (38%) was the highest of this series. The characters of the epidemic were similar to those already described. One main difference in the regimen of this hospital as compared with the others is the preponderance in the use of cow's milk.

Period of epidemic prevalence (July. 2–Sept. 29, 1940)	
Babies born in hospital during this period ..	206
Babies affected in hospital	29
Deaths from neonatal diarrhœa in hospital ..	11

EPIDEMIOLOGY AND ÆTIOLOGY

Further experience must be gained before adequate discussion under this heading is possible. Each of the three epidemics started explosively, so that considerable numbers of infants were affected within a week or two; after this they progressed more slowly, outbreaks A and B continuing for weeks or months till the hospital was closed. Whatever the causal agent, and by whatever mechanism fresh cases are promoted, it can be said that, once the trouble starts, known methods of isolation as practised do not seem capable of stopping it, and that the individual cases are mild, moderate or severe without reference to such factors as sex, birth-weight, age at onset or stage of the epidemic.

Season.—The outbreaks all began in the warm summer months. It is reported that epidemics may occur at any season. All that can be said is that outbreak B continued without remission through summer into winter (December).

Incubation period.—Certain criteria from A suggest that this is short—from 1 to 8 days.

Age-incidence.—Most babies in outbreaks A and B became ill within the first week of life—the great majority within a fortnight. However, the youngest infants are not alone susceptible, as a follow-up (part of B) revealed that many babies developed diarrhœa after being discharged from hospital apparently well. Again, in C, where for various causes numbers of infants were kept in hospital longer than the usual 10–14-day period after birth, 46% were older than a fortnight when first affected.

Causal origin.—In view of the early age (4 days) at which signs may appear, and the short incubation period, the possibility must be envisaged that the disease is congenital or at least transmitted from mother to child at, or immediately after, birth. In fact, the mothers were healthy for the most part and delivered of apparently healthy children, and where there was maternal illness (eclampsia, pyelitis, breast abscess) it seemed to be no more prevalent among the mothers of affected than among those of the unaffected children. No evidence was discovered to implicate as causal factors morbid conditions such as colds, influenza, furuncles or digestive disturbances among the medical or other staff. Many babies both ill and well had a mild conjunctivitis (? prophylactic use of silver nitrate). A few had minor sepsis of the umbilicus or subcutaneous abscesses. Preceding infections of the upper and lower respiratory tracts, or of the central nervous system, were not found. Terminal bronchopneumonia was noted in some and discovered in others at autopsy, as was also pus in the middle ear.

Routine bacteriological throat and stool cultures were obtained from babies, mothers, medical and domestic staff in outbreaks A and B, and stool cultures from the babies in C, but none of the usual pathogens was found. Cultures from pus in the middle ear revealed organisms of the coliform and diphtheroid groups, as well as occasional staphylococci and streptococci.

Morbid anatomy.—Careful autopsies were performed on 9 subjects, 1 in outbreak A and 8 in B. None showed changes of note. As a rule the intestinal tract was normal anatomically and histologically. In one or two cases the intestinal mucosa was slightly hyperæmic. The liver, adrenals, spleen, kidneys and central nervous system were little, if any, different from the normal. The presence of terminal bronchopneumonia and otitis media in some instances has been remarked on.

ONSET AND COURSE OF DISEASE

The onset may be sudden or insidious. All three epidemics included examples of both. In B, many of the cases began slowly and appeared to be difficult to recognise in the early stages. In cases of insidious onset the baby begins to suck less vigorously, or becomes indifferent to food, appears slightly limp and ceases to put on weight. These signs are often misinterpreted. The breast milk is thought to be insufficient and a complement of cow's or other milk prescribed. Again, the disease may begin with a mild diarrhœa or merely a green stool, or there may be slight vomiting or a definite loss of weight.

The sudden onset is characterised by profuse diarrhœa, and usually vomiting, and sometimes a dramatic loss in weight. Where the onset is early (4th or 5th day) the physiological drop in weight is at its maximum, or a gain in weight may have set in. A failure to gain, or a further dramatic drop, may be the first sign that the infant is affected. In outbreak C a few infants in the premature class simply showed signs of collapse with anorexia and a greyish or cyanosed appearance, and died in a day or two without diarrhœa or vomiting. This type of onset has also been noted in some aged victims of true dysentery.

In the milder type of case, the stools become rather frequent, 2–5 daily, relaxed or slightly loose, green or yellow in colour. The appetite is as a rule indifferent but may be quite good, and an alteration in the colour of the stools for several days on end may be the only sign of abnormality. Constitutional symptoms are barely discernible. There is no dehydration, no rise in temperature, and beyond a faint pallor and a failure to gain in weight progress seems satisfactory. The stools may become normal and the whole process be over in a few days. But relaxation of the stools may persist for a week or two, and though there may be a continued absence of the more serious symptoms the appetite will remain poor, and the return to birth weight will be considerably delayed.

In those moderately ill, the stools are more frequent—up to 7 or more in the 24 hours. They are apt to be loose or watery, bright green, or yellow or orange. The infant may vomit once a day or more often. The weight falls by 8–16 oz. within 3–4 days of the onset. The baby becomes listless or drowsy and feeds slowly and reluctantly, has a pale or greyish appearance, and may or may not be manifestly dehydrated. He looks somewhat toxic, and the temperature is unstable—rising or falling a degree or so above normal. The illness lasts at least a week, and is generally prolonged into the second or third week, when recovery sets in with improvement of the appetite and a slow but steady accretion of weight. The stools return to normal rather slowly, and tend to remain a little relaxed or green while the infant is much better in all other respects.

The really serious cases are unmistakable. They become worse rapidly with diarrhœa and vomiting and sudden loss in weight. Vomiting is usually serious, frequent, sometimes projectile, and occurs after food and fluid. It may precede the onset of diarrhœa by a day or two and there is often a degree of abdominal distension. The stools number 3–10 in the 24 hours, are loose or watery, and are apt to vary in colour from time to time, from green of different hues to yellow or brown, and, characteristically, orange. Colic is not a feature. The loss of weight is considerable—1–2 lb. for the average baby. There is serious dehydration, drowsiness alternating with irritability, and sometimes a degree of neck rigidity; but the fontanelle is sunken, and an examination of the cerebrospinal fluid will reveal no change. The face becomes ashen grey, the eyes sunken, and at intervals the lips may be cyanotic. The temperature hovers around 100° F., but may reach 103° F. or 104° F., and the infant looks profoundly toxic. Death usually

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occurs within ten days, sometimes sooner, and generally within a fortnight. Alternatively the symptoms may abate and slow recovery set in.

So far as our limited observations go, complications do not appear to be common. Otitis media is seldom obtrusive, but too few autopsies were undertaken to enable us to judge its real incidence. The same may be said of bronchopneumonia, which when it occurred generally appeared in the final stages of the illness.

PROGNOSIS AND TREATMENT

The prognosis is good in mild and moderate cases, and bad in those defined as serious. Of those considered serious 62% in outbreak A and 81% in B died. The onset of frankly fluid stools, repeated vomiting, restlessness and a hoarse cry worsen the prognosis. The colour of the stools means little. Orange stools may be present in mild cases as in serious. The type of feeding may have some influence on the outcome. In outbreak B, 14% of 51 sick infants entirely breast fed died, contrasted with 60% of 30 given artificial milks with or without breast milk. In outbreak C, all the infants were being fed on cow's milk mixtures when they developed the disease, and the case-fatality was 38%.

No treatment is specific. In all but the mildest, parenteral administration of nutrient and salt-replacement fluids, and of blood or plasma is necessary. In outbreak C, sulphapyridine was tried in some cases without success. Sulphathiazole was tried in those instances where staphylococci were isolated from the stools. The presence of these organisms is of problematical significance, so far as our investigations go, and the drug appeared of little value. Breast milk would seem to be the feeding of choice.

There is only one effective means of halting the spread of the epidemic, and that is to close the entire hospital to admissions, discharge the patients, and thoroughly clean and disinfect the wards before reopening in a week or ten days' time.

COMMENT

Neonatal diarhœa of an epidemic character has recently been described by Rice and his colleagues (1937) as a disease sui generis, using such criteria as (1) its apparent limitation to babies in the first month of life to the exclusion of older infants; (2) the apparent absence of parenteral disease to which it might be secondary; and (3) its non-identification with any known enteral disease. However, during infancy the syndrome of diarrhœa, vomiting and associated effects identical with that of neonatal diarrhœa may arise from a number of infections well recognised or obscure, and until it has been established that epidemics of diarrhœa among the newborn are due to one and not to various ætiological agents the basis for regarding them as specific must rest on an insecure foundation.

Meantime, the term "epidemic diarrhœa of the newborn" will serve a useful purpose if it leads to the more critical scrutiny of infants during their sojourn in hospital, and to the recognition of diarrhœa of an epidemic character at an early stage. Mild cases are easily missed. Slight loss of weight or vomiting in very young infants is a customary experience from irrelevant causes, and apt to be regarded casually by nurses and even experienced sisters. The occasional green stool is a commonplace, and it is unnecessary to exaggerate the importance of these minor symptoms. But it should be borne in mind that for a period of weeks they may be the only token that one baby after another is being affected by the disease in question, until there is a sudden flare-up of serious cases, some of which will be fatal. Another danger is that a considerable proportion of babies may be discharged apparently well but incubating the disease. They are lost sight of. Many of them will be admitted to children's hospitals, where the origin of the disease is never suspected. In fact the number affected by epidemic diarrhœa and the total mortality is probably much greater than one may conclude from a mere study of maternity hospital statistics.

Epidemic diarrhœa of the newborn is not a new disease. It has probably occurred as long as maternity hospitals have been in existence. But the gravity of its effects have not been sufficiently realised. The repetition of an outbreak in the same institution does not appear to be common until, perhaps, after the lapse of many years, so that hospital staffs are not familiar with it, and may not tackle it boldly at the beginning.

Furthermore we have the impression that where an outbreak does arise the hospital authorities tend to be unduly reticent, fearing perhaps for the reputation of the place. Until we are able to prevent these outbreaks it is probable that they will become more common with the expansion of hospital facilities and the decreasing number of confinements in the home. If what has been described in these three epidemics reflects, as it may well do, a state of affairs occurring in other large centres of population, the total of wasted life and effort must be already considerable, and one that the nation cannot afford, least of all now.

When an outbreak is suspected no effort should be spared to determine its true nature, and until this has been done rigid methods should be employed to safeguard those as yet unaffected. When a definite diagnosis has been reached the hospital should be closed at once and the patients discharged. If, at the same time, a careful investigation could be made and the results brought to the notice of the profession the accumulated data would add to our knowledge and might aid in the solution of the problem.

SUMMARY

Three outbreaks of diarrhœa confined to newborn babies arose during the latter half of 1940 in maternity hospitals serving three widely separated cities in England. They were essentially similar in their epidemiological and clinical features. Large numbers of infants were affected and there was an aggregate case-fatality of 29%.

It is suggested that outbreaks of neonatal diarrhœa are of more general occurrence than is realised, and may constitute an important factor in the maintenance of high neonatal mortalities.

It is important that the nature of these outbreaks should be recognised at an early stage so that measures can be taken for the safety of present, and the prevention of future, contacts.

EPIDEMIC NEONATAL DIARRHŒA IN MATERNITY HOSPITALS

II.—BACTERIOLOGICAL ASPECT

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HITHERTO the bacteriological findings in neonatal diarrhœa, or epidemic diarrhœa of the newborn as it is often called, have been variable and inconclusive. In the United States McKinlay (1937) isolated an unidentified species of salmonella from the stools. Kimberley (1939) found *Clostridium welchii* to be the predominating organism in the stools, but he did not regard it as of any ætiological significance. Costello and Lind (1939) attributed the disease to a pathogenic strain of *Proteus vulgaris* associated with *Bacterium coli*. Cron, Shutter and Lahmann (1940) cultured hæmolytic streptococci from the throat and from the stools of all the cases examined, and from the peritoneal fluid in 10 out of 13 cases coming to autopsy. Frant and Abramson (1938), Greenberg and Wronker (1938), and Forbes and Olsen (1939), on the other hand, failed to find any bacteria of importance. In this country Bloch (1941) states that in the outbreak he studied infection was obviously respiratory, and that staphylococci were found in the nose of some of the cases and contacts.

In starting our inquiry it seemed important (*a*) to make as complete a study as possible of the bacterial flora of the fæces of normal and affected infants, and to find out whether the qualitative or quantitative distribution of organisms in the stools was disturbed during the course of the disease; (*b*) to search for known pathogenic organisms, such as those of the salmonella and dysentery groups; and (*c*) on the analogy of lamb dysentery to determine whether toxins formed by anaerobic

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spore-bearing bacteria or by other organisms were present in the fæces. With these objects in view a fairly elaborate technique was designed of which the following is a summary.

TECHNIQUE

A film of the fæces was stained by Gram's method and examined to see if there was any obvious abnormality in the relative numbers of bacterial types present.

Search for organisms of the salmonella and dysentery groups was made by direct plating on MacConkey's agar, and for organisms of the salmonella group in addition by preliminary enrichment in brilliant green and tetrathionate broths.

A suspension of fæces was made in N/4 Ringer solution, standardised by opacity to 3000 million coliform bacilli per ml., and treated as follows. (*a*) One part was heated to 70° C. for 10 minutes and plated out in duplicate on a glucose blood agar medium. One plate was incubated aerobically and the other anaerobically to detect spore-bearing organisms. (*b*) The other part was not heated. Instead, successive tenfold dilutions were made in N/4 Ringer, and 0·1 ml. quantities of the 10^{-2}, 10^{-3}, 10^{-4}, and 10^{-5} dilutions were spread on plates of dry blood agar, glucose blood agar (Eggerth and Gagnon 1933), or liver glucose blood agar (Eggerth 1935), which were incubated anaerobically in a modified McIntosh and Fildes jar and examined usually after 48–72 hours and then again after four or five days. These plates were used for determining the relative numbers and types of micro-organisms present. The identification of the different types was carried out by the usual routine methods. Preliminary observations failed to reveal any advantage in the incubation of plates aerobically as well as anaerobically, and aerobic incubation was therefore discontinued.

The standard suspension was centrifuged at high speed, and tested for toxicity by the inoculation of 0·1–0·2 ml. of the supernatant fluid intravenously into mice, and sometimes intraperitoneally as well.

The fæces were usually examined on the same day as that on which they were passed. If they arrived too late to be examined the same day, they were kept in the refrigerator overnight. In some instances they were transmitted by post or rail and did not arrive till the following day. Experimental observations on healthy infant stools subjected to these different methods of storage showed that little change in the normal flora resulted. Fæces from sick babies were often inoculated immediately after collection on to MacConkey agar plates, in case dysentery bacilli should be present and die out during transmission to the laboratory.

FINDINGS IN NORMAL NON-CONTACT INFANTS

At Oxford specimens of stools from 21 healthy non-contact infants aged 7–23 days were examined, and at Cambridge from 36 healthy non-contact infants aged 3–16 days. These infants were all in maternity homes free from neonatal diarrhœa. All infants were breast fed, though complementary feeds of modified cow's milk were given to a few of them. The results are recorded in table I. The figures on the whole agree very closely. Oxford recorded a slightly higher proportion of coliform bacilli and Cambridge a slightly higher proportion of lactobacilli, but in view of the great variation in frequency to which all groups of organisms were subject in fæces from different infants no weight can be attributed to this discrepancy. It will be seen that about 80% of the organisms cultured from the fæces belonged to the lactobacillus group, about 10% to the group of coliform bacilli, and about 4% each were streptococci and staphylococci. Organisms of the Gram-negative bacteroides group (Eggerth and Gagnon 1933, Weiss and Rettger 1937, Misra 1938) and of the clostridium group were rarely present.

Examination of the individual strains showed that practically all of the lactobacilli were of the *bifidus* type. Most of the coliform bacilli were *Bact. coli* I type (Report 1939), though occasional strains were identified as *Bact. aerogenes*, or belonged to the late-lactose-fermenting or paracolon groups. Proteus seemed to be very uncommon. Of the streptococci present only a proportion were studied fully. The great majority of these corresponded to *Streptococcus fæcalis*, being heat-resistant diplococci, fermenting mannitol but not raffinose, producing the characteristic acid clot with decolorisation in litmus milk, and falling into Lancefield's group D. A few of the strains produced true β-hæmolysis, but most were α-hæmolytic. With one exception the staphylococci were of the *albus* type and were coagulase-negative. *Staphylococcus aureus* was never found in stools from healthy infants at Oxford, and only once at Cambridge. The very few anaerobic spore-bearers that were isolated seemed to be closely related to, if not identical with, *Cl. paraputrificum*, Bienstock (Hall and Snyder 1934).

These findings are in general accord with the classical observations of Tissier (1900), who first drew attention to the great predominance of *Lactobacillus bifidus* in the stools of healthy breast-fed infants.

The intravenous inoculation of mice failed to reveal the presence of any soluble toxin in the stools. At Oxford the animals remained alive and well till they were killed on the fifth day or later. At necropsy nothing abnormal was found. At Cambridge the animals were kept under observation for a longer time. Most of them died in 10–35 days after injection. No obvious changes were seen post mortem, but from the heart blood or peritoneal cavity coliform bacilli were cultivated. These results were attributed to chronic infection with organisms present in the supernatant fluid of the fæces suspensions.

FINDINGS IN OUTBREAK A

Samples of stools from 18 *normal contact* infants aged 1–22 days were examined at Cambridge with the results shown in table II. Compared with the findings in normal non-contact infants at Cambridge (table I) considerable differences are noticeable. The lactobacilli constitute only a small proportion of the fæcal flora, while the coliform bacteria and the staphylococci are preponderant. Too much attention should not be paid to these differences, since owing to the large number of specimens received at once the full quantitative technique could not be carried out, and the figures are therefore open to criticism.

Samples of stools from 9 sick babies suffering from diarrhœa were examined at Cambridge and 3 at Oxford. Macroscopically the stools did not differ greatly from those of the healthy controls. Mucus was not infrequently present in small quantity, but not more often than in the stools of the control babies. Pus or blood was never observed. With few exceptions the reaction was acid to litmus. The bacteriological findings are summarised in table II. Compared with the figures for normal contact infants in the same hospital, the lactobacilli are seen to be more numerous and the staphylococci less numerous. The figures for the coliform bacilli and for the streptococci are much the same. In 6 cases the stools were examined after recovery; the results were not appreciably different from those in the early stage of the disease.

The number of samples examined in this outbreak was relatively small and the observations on the control normal contact infants were not altogether satisfactory. There does not appear, however, to be any considerable difference in the bacterial flora of the stools from the sick and healthy infants in the same hospital, and certainly none that would suggest an adequate cause for the occurrence of diarrhœa.

No organisms of the salmonella or dysentery groups were isolated from any of the stools, and in none of them was a soluble toxin demonstrated by mouse inoculation.

FINDINGS IN OUTBREAK B

Samples of fæces from 14 normal contact infants were examined at Oxford and 10 at Cambridge. The results are given in table III. The Cambridge figures showed a lower proportion of lactobacilli and of coliform bacilli and a higher proportion of streptococci than the Oxford figures. Taken together it will be seen that the chief difference in the distribution of organisms from that in healthy non-contact infants at Oxford and Cambridge (table I) is that the lactobacilli, though still dominant, are less numerous, and the coliform bacilli, and particularly the streptococci, are more numerous.

From sick infants suffering from diarrhœa Oxford examined 10 stools and Cambridge 12. Macroscopically most of the stools were similar to those of healthy babies on a milk diet. Mucus was not infrequently present in small quantity, as it was in the stools of the control contact infants, but pus and blood were absent. With few exceptions the reaction was acid to litmus. The bacteriological findings are summarised in table IV. At Oxford a higher proportion of lactobacilli and a lower

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TABLE I—DISTRIBUTION OF BACTERIA IN FÆCES OF NORMAL NON-CONTACT INFANTS AGED 3–23 DAYS

Type	Oxford (21 infants)			Cambridge (36 infants)			Oxford and Cambridge (57 infants)		
	Samples positive	Per cent. of flora		Samples positive	Per cent. of flora		Samples positive	Per cent. of flora	
		Limits when present	A.M.		Limits when present	A.M.		Limits when present	A.M.
Lacto-bacilli	21	1–100	75	35	29–99	84	57	1–100	81
Coliform	18	< 1–99	16	32	< 1–60	7	50	< 1–99	10
Strepto-cocci	8	< 1–49	5	14	< 1–46	3	22	< 1–49	4
Staphylo-cocci	7	2–20	3	25	< 1–49	4	32	< 1–49	4
Bacteroides	1	17	1	—	—	—	1	17	< 1
Clostridia	1	< 1	< 1	11	< 1–4	2	12	< 1–4	1

Fæces at Oxford were plated on liver blood glucose agar, at Cambridge on blood agar or glucose blood agar.
A.M. = arithmetic mean.

proportion of coliform bacilli were found than at Cambridge; otherwise the results agree fairly closely. Compared with the findings from the control contact infants in institution B (table III), the combined figures for the sick infants show a higher proportion of coliform bacilli and a lower proportion of streptococci.

From no sample of fæces were salmonella or dysentery bacilli isolated, and no sample was found to be toxic for mice.

Since it seemed possible that neonatal diarrhœa might be due to a staphylococcal enterotoxin elaborated in the maternal breast, an examination was made for staphylococci in the milk of sick babies' mothers. Ten strains of these organisms were isolated from seven samples of milk. Four of them proved to be of the *aureus* and six of the *albus* type. The four *aureus* strains were coagulase-positive and three of them produced an α-hæmolysin. None of them produced a β-hæmolysin, and none of them produced enterotoxin as judged by the kitten test of Dolman, Wilson and Cockcroft (1936). The six *albus* strains were all coagulase-negative, hæmolysin-negative and enterotoxin-negative.

Five strains of staphylococci were isolated at Oxford from the fæces of infants with neonatal diarrhœa. Two of these were of the *aureus* type, and were coagulase-positive but enterotoxin-negative. Three were of the *albus* type and were both coagulase- and enterotoxin-negative.

FINDINGS IN OUTBREAK C

No samples of fæces were available from this outbreak, but six strains of staphylococci that had been isolated from the milk of a tuberculin-tested herd supplying the hospital were sent for examination. Four of the strains were of the *aureus* type. They were coagulase-positive, and produced an α-hæmolysin and an enterotoxin. The enterotoxin formed by two of the strains was so powerful that the kittens died within 24 hours. Only one strain was tested for β-hæmolysin, and this was positive. Of the two other strains, one was of the *albus* type and the other produced an orange pigment. Both were coagulase- and enterotoxin-negative.

TABLE II—OUTBREAK A: DISTRIBUTION OF BACTERIA IN FÆCES OF 18 NORMAL CONTACT INFANTS AGED 1–22 DAYS, AND OF 12 SICK INFANTS AGED 4–21 DAYS

NORMAL CONTACT INFANTS				SICK INFANTS			
Type	Samples positive	Per cent. of flora		Type	Samples positive	Per cent. of flora	
		Limits when present	A.M.			Limits when present	A.M.
Lactobacilli	11	2–41	11	Lactobacilli	10	2–73	30
Coliform	17	< 1–96	44	Coliform	12	8–96	55
Streptococci	5	< 1–91	6	Streptococci	12	1–21	8
Staphylococci	14	1–90	32	Staphylococci	7	< 1–15	4
Other organisms *	11	1–64	7	Bacteroides	1	45	4
				Clostridia	2	< 1	< 1

* Other organisms comprised mainly micrococci and diphtheroids.

DISCUSSION

The main question at issue is: What is the cause of neonatal diarrhœa? The following possibilities must be considered.

(1) *Specific infection with an organism of the salmonella or dysentery groups.*—Though Hormaeche and his associates (Bonaba et al. 1940) found that 20% of enteritis in infancy and childhood in Uruguay were due to salmonella infection, and 32% to dysentery infection, we have completely failed to isolate any member of these groups of organisms. It may be remarked that so far as we are aware Hormaeche did not examine any outbreak of neonatal diarrhœa. With the exception of a single outbreak described by McKinlay (1937), who reported the isolation of an unidentified strain of salmonella from the stools of the infants during life and from the heart blood and viscera of one case at autopsy, no evidence has yet been adduced to incriminate these organisms in the causation of this condition.

(2) *Infection with a normally non-pathogenic bacterium.*—This is the view taken by Costello and Lind (1939), who attribute the disease to a pathogenic strain of *P. vulgaris* associated with *Bact. coli*. Cass (1941) likewise seems to take the same view. She found an organism, which was identified, probably incorrectly, as *B. lactis aerogenes*, in the fæces of 5 sick infants. From 2 of the infants that died it was isolated from a consolidated lung and from an umbilical thrombus respectively. Since, however, the same organism was found in the fæces of at least 4 out of 6 healthy infants (no mention is made of the findings in one of the infants), it seems very doubtful whether her conclusion is justified. Our own findings show that the proportion of lactobacilli in the stools is diminished, and the proportion of coliform bacilli, and to a less extent of streptococci, increased. Most of the coliform bacilli appear to be of the *Bact. coli* I type and most of the streptococci appear to be of the enterococcus type belonging to Lancefield's group D. Neither of these organisms can be regarded as abnormal inhabitants of the bowel, and their pathogenic rôle might therefore be discounted. The fact, however, that these organisms were found in much the same proportions in the fæces of healthy contact infants in the same outbreaks, while they were present in much smaller proportions in the fæces of healthy non-contact infants in normal maternity homes makes one cautious in adopting such a conclusion. Without further evidence it is clearly impossible to decide whether these organisms were the primary cause of the disease or whether their undue proliferation was secondary to a disturbance of the bowel caused by some other agent. *Proteus vulgaris* was rarely met with, and its causative rôle in the two outbreaks that were investigated can be ruled out.

TABLE III—OUTBREAK B: DISTRIBUTION OF BACTERIA IN FÆCES OF NORMAL CONTACT INFANTS

Type	Oxford (14 infants)			Cambridge (10 infants)			Oxford and Cambridge (24 infants)		
	Samples positive	Per cent. of flora		Samples positive	Per cent. of flora		Samples positive	Per cent. of flora	
		Limits when present	A.M.		Limits when present	A.M.		Limits when present	A.M.
Lactobacilli	12	7–95	66	8	25–96	47	20	7–95	58
Coliform	12	1–100	21	8	3–28	9	20	1–100	16
Strepto-cocci	10	< 1–93	11	8	9–91	31	18	< 1–93	19
Staphylo-cocci	3	< 1–15	1	5	1–17	4	8	< 1–17	3
Bacteroides	1	6	< 1	..	..	..	1	6	1
Clostridia	4	< 1	< 1	..	..	..	4	< 1	< 1
Diph-theroids	..	..	..	3	16–42	9	3	16–42	4

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TABLE IV—OUTBREAK B: DISTRIBUTION OF BACTERIA IN FÆCES OF SICK INFANTS

Type	Oxford (10 infants)			Cambridge (12 infants)			Oxford and Cambridge (22 infants)		
	Samples positive	Per cent. of flora		Samples positive	Per cent. of flora		Samples positive	Per cent. of flora	
		Limits when present	A.M.		Limits when present	A.M.		Limits when present	A.M.
Lactobacilli	9	9–98	71	11	5–87	50	20	5–98	60
Coliform	9	1–91	22	11	10–100	38	20	1–100	31
Streptococci	4	< 1–10	2	5	2–28	5	9	< 1–28	4
Staphylococci	5	< 1–22	5	2	2–58	6	7	< 1–58	5
Clostridia	5	< 1	< 1	..	..	..	5	< 1	< 1
Other organisms*	..	..	..	3	4–6	1	3	4–6	1

* Other organisms were proteus and yeasts.

(3) *Infection with a pathogenic organism that does not develop readily in culture.*—Though the media we used are able to grow most organisms that are likely to be met with in the intestine, it is possible that some pathogenic organism may have been present in the fæces of the sick infants which failed to develop under the cultural conditions we were employing. We do not regard this as probable, since if such an organism had been present in anything but small numbers, it would probably have been detected in the direct smear examination. Nevertheless, in any future investigation the greatest variety of culture media and of cultural conditions should be employed in the hope of detecting some organism whose requirements are different from those of the more usual pathogenic intestinal bacteria.

(4) *A toxin formed by an organism in the intestine.*—The occurrence of dysentery in newborn lambs due to the formation in the intestine of a powerful toxin by *Cl. welchii* type B affords a strong analogy for the possibly similar causation of neonatal diarrhœa in human infants. This line of investigation seemed all the more promising since Kimberley (1939) had recently reported the finding of *Cl. welchii* as the predominant organism in the stools of infants suffering from neonatal diarrhœa. Our attempts to confirm this hypothesis, however, met with complete failure. Anaerobic organisms were seldom found, and then only in small numbers. Moreover, the direct examination of the fæces for soluble toxins to mice proved negative. The possibility that a toxin was formed by *Staph. aureus* in the intestine seemed very unlikely, since these organisms were rarely found. The formation in the intestine of toxic split-products from one of the milk proteins by a bacterial species, or combination of species, not generally considered pathogenic must also be envisaged, but so far we have no evidence to support it.

(5) *A bacterial toxin ingested with the food.*—*Staph. aureus* is a not uncommon cause of acute mastitis in cows. The milk may contain an enterotoxin formed as the result of the growth of the staphylococci in the udder, though more usually the toxin is not present in sufficient quantities to be detectable till the milk has been left for a few hours at a suitable temperature after withdrawal (Barber 1914, Crabtree and Litterer 1934, Shaughnessy and Grubb 1936). It seemed not impossible that an enterotoxin-producing strain of *Staph. aureus* might gain access to a maternity ward, infect the breasts of some of the mothers, and lead to the development of toxicity in the milk. This hypothesis received some support from the finding in outbreak C that a number of strains of *Staph. aureus* isolated from the milk of a tuberculin-tested herd supplying the hospital were able to produce an enterotoxin. It received further support when we found that a number of the mothers of sick babies in outbreak B were secreting milk containing pathogenic *Staph. aureus*. When we examined these strains, however, by the kitten test, none of them was found capable of forming an enterotoxin. Moreover, subsequent observations showed that coagulase-positive strains of *Staph. aureus* are frequently present in the milk of healthy mothers with healthy babies. While we would not like to exclude the hypothesis of toxin formation by staphylococci or some other organism in the maternal breast, we must admit that the evidence so far available is far too meagre to justify our regarding it as more than a possible cause in some outbreaks.

(6) *Secondary to a systemic infection with an unknown organism.*—It is possible that the diarrhœa may result from general toxæmia due to infection of some part of the body other than the intestine, such as the middle ear or lung. No opportunity was afforded at Oxford or Cambridge of exploring this suggestion, but the results of examinations made locally as well as the findings of other workers do not seem to lend it much support.

(7) *A virus infection.*—To the best of our knowledge no primary infection of the human intestine with a virus has so far been described, though in certain virus infections of animals, such as rinderpest of cattle and ectromelia of mice, extensive invasion of the intestine may occur. The high degree of infectivity of neonatal diarrhœa is consistent with a virus causation, and this possibility should be kept in mind in any future investigation. In only one outbreak was post-mortem material examined for the presence of viruses—by Dr. van den Ende and Miss Dora Lush—and the results were entirely negative. Prof. James McIntosh has suggested in conversation that the condition may be due to infection of the parasympathetic ganglia with a neurotropic virus leading to increased peristalsis. This suggestion again should be borne in mind in any future investigation, but the very short incubation period of the disease in some cases is slightly against it.

(8) *Infection with a protozoon.*—*Giardia intestinalis* and certain other protozoa are responsible for enteritis in children, and it is conceivable that neonatal diarrhœa may be primarily a protozoal infection. Although this possibility cannot be entirely excluded, it may be noted that examination at Cambridge of unstained films of fæces from outbreaks A and B failed to reveal the presence of any protozoa.

Other hypotheses might be suggested, but to no particular purpose. The comparatively mild disturbance in the normal bacterial flora of the intestine in infants suffering from neonatal diarrhœa—a disturbance that may easily be due to the more rapid passage of food through the intestine with consequently insufficient time for the lactobacilli to proliferate in the lower bowel—suggests that the disease is not due to the prodigious multiplication of an abnormal bacterium gaining access to the intestine. The relatively insignificant post-mortem findings, both macroscopic and microscopic, are suggestive more of a toxæmic condition or a virus infection than of a primary bacterial enteritis.

From a bacteriological point of view it is entirely possible that neonatal diarrhœa is not due to a single pathogenic agent. The diverse findings that have been recorded in this disease (see opening paragraph of this article) are curiously reminiscent of those in summer diarrhœa of children, in which the predominant organism in different countries of the world has been found to be *Bact. shigæ*, *Bact. flexneri*, *Bact. sonnei*, a member of the salmonella group, *P. vulgaris*, *P. morgani*, *Pseudomonas pyocyanea*, or *Cl. welchii* (see Topley and Wilson 1936). The gastro-enteritis of infants that have passed the neonatal period, which has recently been described by Dobbs (1941) as the greatest menace to infants with pyloric stenosis admitted to English hospitals, likewise remains of uncertain ætiology. It may be that all these different diarrhœal complexes are of similar causation, and are due to (*a*) a primary virus infection or (*b*) some systemic bacterial infection or metabolic disturbance, either or both of which paves the way for the proliferation in the intestine of any pathogenic or potentially pathogenic organism that happens to be present. In this connexion it may be that organisms which are non-pathogenic to adults may under favourable conditions assume pathogenicity for infants and young children.

CONCLUSIONS

1. Though it would be unjustifiable to draw any definite conclusions from the limited material we have examined, there seems no evidence to suggest that organisms of the salmonella or dysentery groups are concerned in neonatal diarrhœa.

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2. There is no evidence of the formation of soluble toxic substances by anaerobic bacilli in the intestine, analogous to what occurs in lamb dysentery.

3. There is no evidence of the formation of toxic substances under bacterial action in the maternal breast, though this possibility cannot be excluded.

4. The fact that the fæcal flora in diseased infants differs only slightly from that in normal infants under similar environmental conditions suggests that neonatal diarrhœa is not ordinarily caused by an abnormal organism gaining access to the intestine and multiplying prodigiously.

5. It seems more probable that neonatal diarrhœa results from either (*a*) a virus invading the intestine, or possibly the parasympathetic ganglia, and giving rise to increased peristalsis; or (*b*) a systemic infection, intoxication, or general metabolic disturbance leading to the proliferation of any pathogenic or potentially pathogenic organism that happens to be present in the bowel.

SUMMARY

Normal infants.—A quantitative cultural examination was made at Oxford and Cambridge of the fæcal flora of 57 normal non-contact breast-fed infants, 3–23 days of age, in maternity homes free from neonatal diarrhœa. On the average *Lactobacillus bifidus* was found to constitute about 80% of the organisms, coliform bacilli about 10%, and streptococci and staphylococci each about 4%. Members of the clostridium group and of the bacteroides group were found infrequently, and then in only small numbers. The proportions, however, in which the different organisms were present was subject to great variation from infant to infant. Most of the coliform bacilli belonged to the *Bact. coli* I type, and most of the streptococci to the enterococcus type. *Staph. albus* was found in rather more than half the infants, but *Staph. aureus* was isolated only once.

Infants with neonatal diarrhœa.—The fæcal flora was studied in two outbreaks, a total of 34 infants being examined. The proportion of lactobacilli was reduced to 30 and 60%, and the proportion of coliform bacilli increased to 55 and 31% respectively. Very similar changes, however, were found in control healthy contact infants during the same outbreaks. The proportion of streptococci and staphylococci showed but little change. Organisms of the clostridium and bacteroides groups were seldom present. No organisms of the salmonella or dysentery groups were found, and no evidence was obtained of the existence in the stools of soluble toxins for mice. In one outbreak *Staph. aureus* was isolated from the milk of a number of mothers with sick children and was found to be coagulase-positive and hæmolysin-positive. None of the four strains studied, however, was able to form an enterotoxin. On the other hand, four strains isolated in connexion with another outbreak from the milk of a tuberculin-tested herd supplied to the hospital were found to be coagulase-positive, hæmolysin-positive, and enterotoxin-positive.

REFERENCES

Barber, M. A. (1914) *Philipp. J. Sci.* B, **9**, 515.
Barenberg, L. H., Levy, W. and Grand, M. J. H. (1936) *J. Amer. med. Ass.* **106**, 1256.
Best, W. H. (1938) *Ibid.*, **110**, 1155.
Bloch, E. (1941) *Brit. med. J.* **1**, 151.
Bonaba, J., Carrau, A., Hormaeche, E., Zerbino, V., Aleppo, P. L., Peluffo, C. A., Peluffo, E., Praderi, J. A., Ramon Guerra, A. and Surraco, N. L. (1940) Estudios sobre la Etiologia infecciosa de las Diarreas infantiles, Monte Video.
Cass, J. (1941) *Lancet*, **1**, 346.
Costello, J. P. and Lind, H. E. (1939) *Sth med. J.* **32**, 620.
Crabtree, J. A. and Litterer, W. (1934) *Amer. J. publ. Hlth*, **24**, 1116.
Craig, W. S. (1936) *Lancet*, **2**, 68.
Cron, R. S., Shulter, H. W. and Lahmann, A. H. (1940) *Amer. J. Obstet. Gynec.* **40**, 88.
Dobbs, R. H. (1941) *Lancet*, **1**, 661.
Dolman, C. E., Wilson, R. J. and Cockcroft, W. H. (1936) *Canad. publ. Hlth J.*, **27**, 489.
Eggerth, A. H. (1935) *J. Bact.* **30**, 277.
— and Gagnon, B. H. (1933) *Ibid*, **25**, 389.
Forbes, R. P. and Olsen, F. B. (1939) *Arch. Pediat.* **56**, 250.
Frant, S. and Abramson, H. (1937) *J. Pediat.* **11**, 772.
— — (1938) *Amer. J. publ. Hlth*, **28**, 36.
Greenberg, M. and Wronker, B. M. (1938) *J. Amer. med. Ass.* **110**, 562.
Hall, I. C. and Snyder, M. L. (1934) *J. Bact.* **28**, 181.
Kimberley, A. M. (1939) *New Engl. med. J.* **220**, 664.
McKinlay, B. (1937) *Amer. J. Dis. Child.* **54**, 1252.
Misra, S. S. (1938) *J. Path. Bact.* **46**, 204.
Report (1939) The bacteriological examination of water supplies. *Rep. publ. Hlth med. Subj. Lond.* No. 71.

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NEPHRECTOMY IN UNILATERAL RENAL DISEASE WITH HYPERTENSION

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THE association between renal disease and hypertension is well recognised. In view of this it seems that cases of hypertension without clinically obvious renal deficiency are too often grouped as essential hypertension. Schroeder and Steele [16] investigated 71 cases diagnosed as essential hypertension and found that 50 showed abnormalities of the urinary tract, 38 being unilateral. Of 600 cases of hypertension, Maher and Wosika [17] demonstrated urological disorders in 101.

In cases which have unilateral renal lesions amenable to surgical treatment, it is clearly of value to study the effects of therapy on the hypertension with a view to discovering possible ætiological agents. We have recently had the opportunity of studying 2 such cases.

CASE-HISTORIES

CASE 1.—A man, aged 35, was admitted complaining of frequent attacks of left-sided renal colic. About 4½ years before he had severe headaches and morning epistaxis, and a few months later was admitted to hospital for difficulty in walking and partial aphasia. There he was found to have a right hemiplegia and a blood-pressure of 200/130 mm. Hg; his urine contained albumin but no red cells or casts; his blood-urea was 26 mg. per 100 c.cm. The symptoms disappeared with rest and he was discharged as a case of essential hypertension. Two years later he was again complaining of headaches and epistaxis, but also of pain in the left loin which gradually increased in frequency and severity until he was readmitted to hospital on Aug. 19, 1940. Examination showed slight involuntary movements of the right hand with increased deep reflexes in the arm and leg on that side and absence of the right abdominal reflexes; there was a right extensor plantar response. The pulse was regular; the blood-pressure varied from 235/140 to 245/140. There was slight enlargement of the heart to the left and an accentuated aortic second sound. Urine: albumin present; numerous pus cells, a few red cells and cellular casts. Blood-urea 30 mg. per 100 c.cm. A radiogram showed opacities in the left renal area and intravenous pyelography localised these to the renal pelvis. There was deficient excretion on the left side, but normal excretion on the right side.

Nephrectomy was performed by Mr. N. Hodgson on Sept. 2. At the lower pole the kidney substance was largely replaced by caseous material; in the mid-zone there was a tuberculous focus completely destroying an area about 3 cm. in diameter. The pelvis was not dilated. At the upper pole there was one area suggestive of hypertensive renal atrophy. Histological examination showed active renal phthisis. Outside the tuberculous areas there was an occasional sclerosed glomerulus, otherwise the glomeruli showed dilatation of the capsular spaces. Some of the arterioles and a branch of the renal artery at the hilus showed muscular hypertrophy.

The patient made a rapid recovery from the operation and there was immediate symptomatic improvement. He was discharged from hospital on the 14th postoperative day, and has been seen at intervals in the succeeding 7 months. While in hospital, and at his subsequent visits, the blood-pressure was taken under standard conditions. After a transitory fall to below normal levels, as a result of postoperative shock, the pressure was maintained at a normal level for a time, and then rose slightly to the region of 150/100, where it has remained. When last seen, hypertensive symptoms had completely disappeared, and the patient has joined the N.A.A.F.I. and is prepared for foreign service.

CASE 2.—A man, aged 55, was admitted to hospital complaining of a dull aching pain in the right loin of one week's

DR. CROWLEY AND OTHERS: REFERENCES (*continued*)

Rice, J. L., Best, W. H., Frant, S. and Abramson, H. (1937) *J. Amer. med. Ass.* **109**, 475.
Shaughnessy, H. J. and Grubb, T. C. (1936) *J. infect. Dis.* **58**, 318.
Tissier, H. (1900) Recherches sur la flore intestinale des nourrisons, Paris.
Topley, W. W. C. and Wilson, G. S. (1936) Principles of Bacteriology and Immunity, *London*, 2nd ed., p. 1245.
Weiss, J. E. and Rettger, L. F. (1937) *J. Bact.* **33**, 423.

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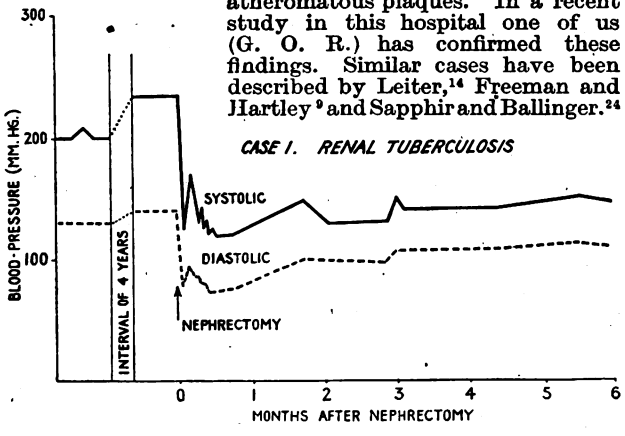
duration. He had also noticed blood in his urine with occasional small clots. A mass was felt in the region of the lower pole of the right kidney. The blood-pressure varied from 195/105 to 185/95. Cystoscopy and retrograde pyelography were performed on March 3, 1941. The right ureteric orifice was inflamed and pouting; the radiogram showed a filling defect of the right renal pelvis and major calyces. Nephrectomy was performed by Mr. W. A. Hewitson on March 10, 1941. More than half the kidney substance was replaced by yellow tumour nodules with numerous areas of hæmorrhage; the main renal vein at the hilus was almost occluded by tumour. The histological appearances were typical of hypernephroma.

The patient made an uninterrupted recovery. The blood-pressure declined to 130/80, and has remained at this level.

DISCUSSION

The relation between hypertension and a coincidental unilateral renal lesion is best demonstrated by the result of removal of the affected kidney. We have been able to find 28 previously reported cases.[1 2 5 6 7 8 13 16 19 20 21 23 25] An analysis of these cases shows that they fall into four groups, each of which has its experimental counterpart.

1. *Renal arterial occlusion.*—Goldblatt and his collaborators[10] have shown that partial occlusion of the main renal artery produced hypertension. Leadbetter and Burkland[13] have recorded a case in a child with hypertension in which nephrectomy was performed for a ptosed kidney, the renal artery of which was found to be partially obstructed by a smooth-muscle tumour. The operation resulted in a cure of the hypertension. In an examination of autopsy material, Blackman[4] has shown that in most cases with essential hypertension there is partial occlusion of one or both main renal arteries by atheromatous plaques. In a recent study in this hospital one of us (G. O. R.) has confirmed these findings. Similar cases have been described by Leiter,[14] Freeman and Hartley[9] and Sapphir and Ballinger.[24]

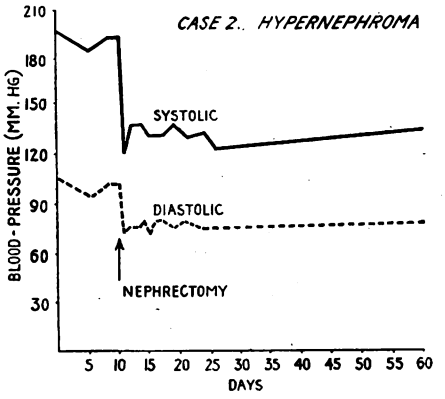


2. *Lesions resulting in partial occlusion of the renal vein.*—Bell and Pederson[3] and Menendez[18] showed that experimental partial occlusion of the renal vein resulted in hypertension. This has been recorded by Perry and Taylor[22] in an autopsy on a child with hypertension apparently due to thrombosis of the renal veins. Our second case is highly suggestive of an ætiological association between partial venous occlusion and hypertension.

3. *Diseases of the kidney substance.*—The association of chronic diffuse nephritis with hypertension is too well known to require further comment. Attention has lately been drawn to the occurrence of hypertension in cases of chronic pyelonephritis, even when the lesion is unilateral.[15] Several cases of this type with successful surgical intervention have been reported, and our first case is another example. Experimentally, chronic interstitial fibrosis of the kidneys produced by X rays has resulted in hypertension.[12]

4. *Lesions causing obstruction to the outflow of urine.*—Harrison and his colleagues[11] produced hypertension by occlusion of one or both ureters. Clinical examples of this type are frequent.

It appears that in most of the cases reported in the literature removal of the diseased kidney has been followed by a substantial and prolonged fall in the blood-pressure. It might be claimed that such a fall would follow any major surgical operation. Volini and Flaxman[27] have investigated the effect of a variety of non-specific operations carried out on hypertensive patients. They have shown that, although in many cases there is definite symptomatic improvement, there is no alteration in the blood-pressure apart from the transitory fall due to postoperative shock. In all except 5 of the recorded cases the blood-pressure fell to 150/100 or lower after unilateral nephrectomy, and remained at this level. Of the exceptions, in one the pressure remained between 140/74 and 160/90 for a considerable time (unstated), but 11 years later it had risen to 190/122[8]; no investigation of the remaining kidney was carried out at that time, so it is possible that it had become diseased. At the time of operation 2 other reported cases[25] showed evidence of diminished renal function in the intact kidney, so it seems probable that they were not cases of unilateral renal disease. In the fourth unsuccessful case, the pathology was not clearly demonstrated.[23] In the case recorded by Mulholland,[19] the lesion (renal calculus) had been present 14 years before, at which time the patient had refused operation. When treatment was undertaken, severe cerebral symptoms were present; these decreased sufficiently after nephrectomy for the patient to do her normal work.



It is premature to speculate about the mechanism whereby hypertension is produced in these cases, but it is clear that a careful investigation of all cases of supposed essential hypertension will reveal many cases with lesions of one kidney amenable to surgical treatment. The recorded cases show that when hypertension is associated with unilateral renal disease relief both of the hypertension and the symptoms will probably follow nephrectomy.

SUMMARY

Two cases of hypertension, one of which had previously been classed as essential hypertension, are reported in which unilateral renal lesions were treated by nephrectomy with significant lowering of the blood-pressure.

Similar cases reported elsewhere fall into four groups showing: renal arterial occlusion; partial occlusion of a renal vein; diseases of the kidney substance; or lesions causing obstruction to the outflow of urine. Each of these has an experimental counterpart.

In view of the therapeutic results and the known association between unilateral renal disease and hypertension, all cases of chronic hypertension should have a complete urological investigation

We wish to thank Mr. N. Hodgson, Mr. W. A. Hewitson and Dr. J. C. Spence for permission to use the records of the cases which were under their care.

REFERENCES

1. Barker, N. W. and Walters, W. *Proc. Mayo Clin.* 1938, **13**, 118.
2. Barney, J. D. and Suby, H. I. *New Engl. J. Med.* 1939, **220**, 744.
3. Bell, E. and Pederson, A. *Ann. intern. Med.* 1930, **4**, 227.
4. Blackman, S. S. *Bull. Johns Hopk. Hosp.* 1939, **65**, 353.
5. Bothe, A. E. *J. Urol.* 1939, **42**, 969.
6. Boyd, C. H. and Lewis, L. G. *Ibid*, 1938, **39**, 627.
7. Butler, A. M. *J. clin. Invest.* 1937, **16**, 889.
8. Crabtree, E. G. *Trans. Amer. Ass. G.U. Surg.* 1938, **31**, 299.
9. Freeman, G. and Hartley, G. *J. Amer. med. Ass.* 1938, **111**, 1159.
10. Goldblatt, H., Lynch, J., Hanzal, R. and Summerville, W. *J. exp. Med.* 1934, **59**, 347.
11. Harrison, J., Mason, M., Resnik, H. and Raney, J. *Trans. Ass. Amer. Phys.* 1936, **51**, 280.
12. Hartman, F., Bollinger, A. and Doub, H. *J. Amer. med. Ass.* 1927, **88**, 139.
13. Leadbetter, W. F. and Burkland, C. E. *J. Urol.* 1938, **39**, 611.
14. Leiter, L. *J. Amer. med. Ass.* 1938, **111**, 507.
15. Longcope, W. T. and Winkenwerder, W. L. *Bull. Johns Hopk. Hosp.* 1933, **53**, 255.
16. McIntyre, D. W. *J. Urol.* 1939, **41**, 900.
17. Maher, C. C. and Wosika, P. H. *Ibid*, p. 893.
18. Mendenez, E. *C.R. Soc. Biol. Paris*, 1933, **113**, 461.
19. Mulholland, S. W. *J. Urol.* 1939, **42**, 957.
20. Nesbitt, R. M. and Ratliff, R. K. *Ibid*, 1940, **43**, 427.

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BLACK-CURRANT PUREE AS A SOURCE OF VITAMIN C

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THIS investigation was started to determine the minimal dose of vitamin C, in the form of a black-currant puree, that was required to supplement adequately the routine diet in some children's wards of an E.M.S. hospital. Black-currant puree was chosen as being the most satisfactory substitute for orange juice available (Olliver 1940). During the winter and spring the diet at the hospital was as good as the local food position allowed and probably better than that of many children in this country at the time. Nevertheless it was found that the vitamin-C intake was unlikely to exceed 5 mg. ascorbic acid a day and that only if the children ate up all their ration of greens. One child, who had been in hospital for several months, actually developed mild clinical scurvy.

In planning the investigation it was decided to adopt the simple technique of Pemberton (1940), owing to the difficulties entailed in collecting accurately over a given period urine from infants and small children in a ward. In the morning the child passes a specimen of urine and is then given a test dose of 50 mg. of ascorbic acid per stone weight. After about 2½–3 hours urine is again passed and the specimen discarded. The urine is passed again about 2 hours later. The ascorbic acid in the first and third specimens is then estimated by the technique of Harris and Ray (1935). An increase of at least 3 mg. per 100 c.cm. is taken to indicate a reasonable degree of saturation.

RESULTS

Fifty-nine children were given a preliminary test and not one gave a positive result. The children were then given a daily supplement either of synthetic ascorbic acid or of black-currant puree. The puree used contained 0·8–0·9 mg. ascorbic acid per g. and was well tolerated even by the youngest children. The usual dose was 50 mg. of ascorbic acid or 1½ oz. of puree (40 mg. of ascorbic acid). Periodic re-tests at about weekly intervals were made to see if any improvement had occurred. In only two out of thirty-five children in the hospital were there any signs of improvement after 9–20 days on the supplement, although healthy children living on a farm selected as a control group on a better diet became saturated in just over a week.

It was then decided to saturate the children with a daily dose of 50 mg. per stone and to re-test at three-day intervals (transport difficulties prevented more frequent testing). Fourteen children became saturated in the first 3-day period, and seven of these had previously been given 40–50 mg. of ascorbic acid daily. Six children took 3–6 days to saturate, and two of these had previously been given ascorbic acid. Six children took over 6 days and one failed to become saturated in 24 days. It is of interest to compare these results with those of Harris (1940). Using a somewhat similar saturation technique he found that subjects having a satisfactory diet gave a positive saturation test on the first or second day of the saturation dose, and that the worse the diet had been the longer was the time taken to obtain a positive result. It will be seen that in many cases the degree of unsaturation was extreme.

Once saturated, the children were given either ¾ or 1½ oz. of black-currant puree daily (20 or 40 mg. ascorbic acid) and were re-tested at intervals of 9–10 days. If saturation was maintained on 1½ oz. then ¾ oz. was tried. Unfortunately many of the children were discharged before the lower dose could be tried, so the attempts to find the minimal maintenance dose of ascorbic acid were only partially successful. The average maintenance dose at different ages was as follows. The results obtained have been expressed as mg. of ascorbic acid per stone recorded at different ages.

Ages	mg. ascorbic acid per stone	Av.
0– 3	11, 13, 17, 8, 16	15
3– 6	10, 4, 14	9
6– 9	6, 4, 7, 6, 7	6
9–12	4, 8, 10	7

It is probable that the actual minimal maintenance dose is less than these figures suggest. It is hoped that further work will produce a more accurate result.

A child of 1½ years with clinical scurvy was investigated in the earlier stage of this work. She was cured by six daily doses of 4 oz. black-currant puree and 1 oz. a day was more than sufficient to maintain saturation.

The diseases for which the children were admitted were various, both surgical and medical, and included such cases as talipes, harelip, mastoid (postoperative), cervical adenitis, asthma, debility, bronchiectasis and subacute nephritis, but by the time the maintenance test periods had been reached all but a few of the children were convalescent, afebrile and free from symptoms. Eight cases either failed to saturate within 9 days or failed to maintain saturation on 40 mg. per day; their diagnoses were: chorea (2), hyperthyroidism (1), ulcerative colitis (2), recurrent pyrexia (1) and cœliac disease (2). The following case is an example of the findings in the majority of cases.

Date	Daily dose of ascorbic acid	Ascorbic acid in urine	
		Before test dose	3–5 hr. after test dose
		mg. per 100 c.cm.	
April 11	None	0·15	None
,, 28	50 mg. (ascorbic acid)	0·8	0·55
May 2–4	200 mg. (in 3 days)	1·1	25·6
,, 13	40 mg. (1½ oz. b.-c. puree)	13	55
,, 23	40 mg. (1½ oz. b.-c. puree)	2·2	29·8
June 2	20 mg. (¾ oz. b.-c. puree)	0·7	24

Age 6½ years; weight 49 lb.; admitted for investigation of state of lungs? bronchiectasis.

The difference in response to the test dose when saturation is attained is striking. The ascorbic-acid content of the first specimen of urine before the test dose has very little value as an index of saturation, for unless an excess is being given, the urine contains little or no ascorbic acid.

DISCUSSION

This experiment is only a preliminary survey and the conclusions reached are only approximately correct. There are three sources of error, the first two of which we believe to cancel out the third. The first is the variable amount of ascorbic acid taken in the diet—this has been assessed at 5 mg. daily and ignored. The second is the effect of the test dose given at irregular intervals, never less than 10 days and often as much as 21 days. This would, of course, increase the minimal maintenance dose, but the amount cannot be calculated, as the excess over the saturation requirements is rapidly excreted; in effect this means that the subject starts every new test period freshly saturated and with an unknown but small amount of ascorbic acid in hand. The third error is due to our inability to complete the full test in every subject by finding the level at which saturation is not maintained. In most cases, however, the response to the test dose was definitely smaller on the lower dose, indicating a decrease of the saturation level, and thus there was reason to consider that the minimal maintenance dose had been reached to within a few milligrammes.

DRS. RICHARDSON AND SMART: REFERENCES (*continued*)

21. Pincoff, M. C. and Bradley, J. E. *Trans. Ass. Amer. Phys.* 1937, **52**, 320.
22. Perry, B. C. and Taylor, A. L. *J. Path. Bact.* 1940, **51**, 369.
23. Ratliff, *Univ. Hosp. Bull. Ann Arbor*, 1939, **5**, 42.
24. Sapphir, O. and Ballinger, J. *Arch. intern. Med.* 1940, **66**, 541.
25. Schroeder, H. A. and Fish, G. W. *Amer. J. med. Sci.* 1940, **199**, 601.
26. Schroeder, and Steele, J. M. *Proc. Soc. exp. Biol., N.Y.* 1938, **39**, 101.
27. Volini, I. F. and Flaxman, N. *J. Amer. med. Ass.* 1939, **112**, 2126.

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SUMMARY

Convalescent children in a children's ward were saturated with ascorbic acid. Ascorbic acid in the form of black-currant puree was then given as a dietary supplement and the level at which saturation could be maintained was determined by the urinary response to a test dose of ascorbic acid. The level of the daily dose was found to vary from 15 to 6 mg. per stone according to age, corresponding to average daily doses of 1½–2 oz. puree per child.

Our thanks are due to Dr. Janet Gimson and the ward sisters and staff for help in collecting the specimens; to Messrs. Chivers for supplies of black-currant puree and to Miss Mamie Olliver for some analyses and advice.

REFERENCES

Harris, L. J. (1940) *Lancet*, **2**, 259; and Ray, S. N. (1935) *Ibid*, **1**, 71.
Olliver, M. (1940) *Ibid*, **2**, 190.
Pemberton, J. (1940) *Brit. med. J.* **2**, 217.

LUPUS ERYTHEMATOSUS AND TUBERCULIN TESTS

JOHN KELVIN, M.B. LEEDS, L.R.C.P.E.

THE ætiology of lupus erythematosus is still in dispute. Some authorities regard it as always a tuberculide, some as always a result of focal sepsis; some think it may be either one or the other, some blame an undiscovered organism, and some suggest that the toxin of either the tubercle bacillus or a streptococcus has sensitised the skin to light. This last explanation should mean that the condition is simply an actinic dermatitis. If so, why should light produce the peculiar lesion of lupus erythematosus? And why should two entirely different organisms produce the same unique bizarre and—in general practice—rare lesion? It is easy to understand that different causative factors might produce dermatitis or erythema, but this lesion is distinctive. Can more than one organism produce a gumma?

In my opinion lupus erythematosus is due to an innate characteristic of the skin, usually congenital but sometimes acquired, which renders it peculiarly susceptible to the action of mild tubercle toxin. The action of the toxin is aggravated by irritation, which may be extrinsic (heat, cold, friction, injury or light), or intrinsic (sepsis or worry). The irritation produces a secondary specific toxin which actually causes the lesion and I believe this toxin to be of the nature of a mild slowly acting caustic.

These opinions are based on the results of tuberculin testing in a series of 148 cases of lupus erythematosus (including 3 of the disseminated variety) and 240 people with healthy skins or other dermatological conditions. All the patients, except one aged 14, were adults. The

TABLE I—RESULTS OF MANTOUX TEST IN 86 CASES OF LUPUS ERYTHEMATOSUS AND 140 CONTROLS

Strength of old tuberculin used	Lupus erythematosus		Controls		
	Cases	Positive	Diagnosis	Cases	Positive
1/100, 1/1000, 1/10,000	24	15 (62·5%)	Miscellaneous dermatoses	20*	8 (40%)
1/500, 1/1000	17	14(82%)	,,	24	4 (16·6%)
1/1000 ..	25	19(76%)	,,	32	5 (16%)
1/600, 1/650; 1/660, 1/700, 1/750	20	15(75%)	,,	34	5 (15%)
			Psoriasis	10	3 (30%)
			Tuberculides	10	6 (60%)
			Healthy skin	10	0
Totals ..	86	63(73%)	—	140	31 (21·5%)

* Including 2 tuberculides.

results are shown in tables I and II. In addition, simultaneous Mantoux and Lederle tests were carried out on 300 cases of miscellaneous dermatoses, including 6 tuberculides. Of the 300, 61 (20%) gave a positive Mantoux test and 56 (19%) a positive Lederle test.

It will be seen that altogether 105 of the 148 cases of lupus erythematosus gave a positive tuberculin reaction (71%), compared with 43 of the 240 controls (18%). Moreover, a tuberculous history—old tuberculous glands, healed phthisis, or tuberculosis in the family—was commoner among the cases of lupus erythematosus than among the controls. In one patient the lesions of lupus erythematosus were seen alongside and merging into the tuberculous lesions of Bazin's disease; other observers have reported them in association with lupus vulgaris.

The incidence of sepsis was no commoner among the cases of lupus erythematosus than among the controls. Moreover, sepsis is too common and lupus erythematosus too rare for sepsis to have any important ætiological significance. On the other hand, where septic foci are found in cases of lupus erythematosus they might easily be primarily tuberculous foci in which secondary infection has obscured the picture. I performed "septic" tests, analogous to the Mantoux test, in a small series of cases, but failed to demonstrate any increased sensitivity to the toxins of septic organisms. Thus I tested 24 cases of lupus erythematosus with the toxins of three organisms, used separately—those of *Streptococcus hæmolyticus*, *Strep. viridans* and a staphylococcus. Only one patient responded, giving positive reactions to *Strep. hæmolyticus* and the staphylococcus. Among 20 controls, too, only one patient responded, giving a positive reaction to the hæmolytic streptococcus but to neither of the other two organisms. I then used a mixture of all three toxins on

TABLE II—RESULTS OF LEDERLE (VOLLMER) TUBERCULIN PATCH TEST IN 62 CASES OF LUPUS ERYTHEMATOSUS AND 100 CONTROLS

Lupus erythematosus		Controls		
Cases	Positive	Diagnosis	Cases	Positive
—	—	Miscellaneous dermatoses	80*	12 (15%)
62	42 (67·7%)	Healthy skin	20	0
		Total ..	100	12 (15%)

* Including 2 tuberculides.

16 other cases of lupus erythematosus, none of which gave a reaction, whereas there were 8 positive responses in a group of 48 controls.

Various causative factors have been suggested by different investigators, but countless people have one or more such factors operating strongly without developing lupus erythematosus. Further, in other dermatoses alleged to be due to toxins—pemphigus, for example—the mucous membranes are affected; in lupus erythematosus the mucous membranes are rarely attacked primarily and I think this also points to an innate susceptibility on the part of the skin.

In my view the ætiology of the condition has the following sequence:—

Congenital predisposition → tuberculous toxin → some form of irritation → secondary toxin → lupus erythematosus.

The endotoxin of the tubercle bacillus is incriminated rather than the bacillus itself because Koch's bacillus is not found in the lesions on microscopic examination, nor are tubercles present. Light has been assigned a share in causation by some because the lesions of lupus erythematosus appear on exposed areas; these areas, however, are exposed to general and constant irritation from various factors including light, so that "exposed parts" can be taken to be synonymous with "irritated parts." Finally, it seems to me that only a substance with a cauterising action could produce the characteristic lesions and this I believe to be produced in the congenitally susceptible skin as a result of irritation.

SUMMARY

A series of 148 cases of lupus erythematosus and 240 people with normal skins or other dermatological conditions were submitted to Mantoux or Lederle tuberculin tests; 71% of the lupus erythematosus cases gave positive reactions, compared with 18% of the controls.

Tests analogous to the Mantoux test were performed with the toxins of three septic organisms—*Strep. hæmolyticus*, *Strep. viridans* and a staphylococcus—on

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24 cases of lupus erythematosus and 20 controls. Only one patient in each group gave a positive result. When a mixture of all three toxins was used there were no positive results in 16 cases of lupus erythematosus, but 8 positives in 48 controls.

It is suggested that lupus erythematosus is produced in susceptible people by the action of tuberculous toxin, extrinsic or intrinsic sources of irritation acting as secondary factors.

PREVENTION OF DROPLET-BORNE INFECTIONS BY SPRAY

A FIELD EXPERIMENT

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COLONEL, A.M.S.

I. C. GILLILAND, M.B. EDIN.
MAJOR, R.A.M.C.

INCREASING interest has lately been centred on the use of various methods designed to minimise the spread of infections, and the outbreak of war has stimulated research with a view to applying the results of laboratory observations to the treatment of crowded rooms and air-raid shelters. The limitations of the laboratory experiments have been realised by Andrewes,[1] who in the summary of a recent paper says: "We have discovered certain methods for the control of respiratory disease; none of these is of proved efficacy in the field, though all of them have given encouraging results in the laboratory." The necessary field experiments can be carried out most accurately under Service conditions, where large bodies of troops can be surveyed in strictly comparable conditions. With this end in view we carried out such an experiment during the respiratory epidemic period of January–March, 1941.

Two main conditions must be established for the statistical results to be of value. First, the methods used must be so simple that there is a real likelihood of their being effectively carried out by the N.C.O.s charged with the duty, and the materials used must be cheap and readily available; this prevents the use under Service conditions of the more complicated forms of spray and especially of the continuous electrically operated spray. Secondly, a sufficiently large number of men, with an equal number of controls, all equally exposed to the introduction of infection from their contacts with the civil population, and all living under identical conditions of accommodation, clothing, diet and occupation, must be involved in the experiment. The personnel of a searchlight brigade were selected as satisfactory subjects, for, with the exception of a few headquarters personnel occupying buildings, the men were all accommodated in huts under comparable conditions, receiving the same short home leave. The brigade was widely dispersed over a mixed urban, mining and agricultural area of Scotland with fairly equal access to picture houses and other places of entertainment. Thanks to the collaboration of Brigadier A. H. Morton and the regimental commanders the following arrangements were made:

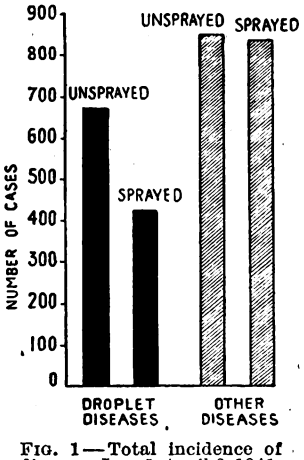

FIG. 1—Total incidence of disease; Jan. 5–April 6, 1941.

Twelve batteries were selected, each battery area adjoining that of its neighbours without any gaps between them. Alternate batteries were sprayed over the whole area, leaving the intervening ones unsprayed. Thus sprayed and unsprayed personnel were fairly evenly distributed over the segment of the British Isles involved. By this means some 3000 men were subjected to spray with about an equal number of controls.

Laboratory investigations have shown that hypochlorite solutions are effective in low concentrations. Hypochlorite was easily accessible to the units in question in the form of the water-sterilising powder actually in use for the treatment of water-supplies. Simple intermittent spraying was therefore carried out in all huts, kitchens, messing-rooms, &c. with an approximately 1% solution of this bleaching powder. The spraying was carried out with the "Flit-gun" variety of sprayer.

Spraying batteries were instructed to spray every hut thrice daily—at reveille, on coming off duty in the late afternoon, and at lights out, these being the periods at which the greatest concentration of salivary droplets may be expected. The Flit-gun container was filled with water and a half scoopful of water-sterilising powder added to it and shaken. The N.C.O. in charge then walked slowly round the hut spraying obliquely upwards towards the ceiling and continued to do so until the whole hut had a quite noticeable but not irritating odour of hypochlorous acid. Complicated methods of control of dosage were clearly out of place and the exact strength of the spray varied because of differences in the construction of different makes of sprayer and deterioration of the solution which is often left in the gun and used again without being freshly made up. The method of spraying to the limit of nasal tolerance for hypochlorous acid is both a simple and practical guide to the unskilled soldier.

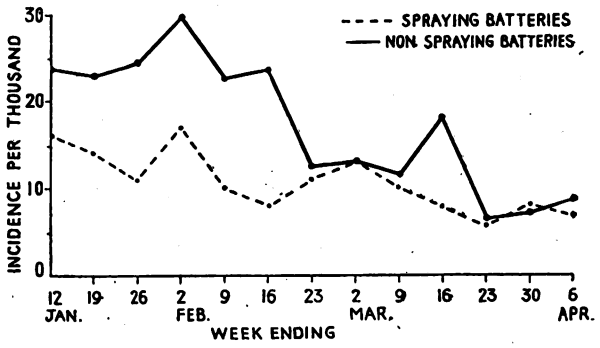

FIG. 2—Incidence of droplet infections per thousand.

The medical officers of both sprayed and unsprayed batteries completed a weekly return to the brigade senior medical officer showing: (*a*) the ration strength of the battery for the week; (*b*) the number of men reporting sick on account of droplet infection; (*c*) the number of cases of sickness from causes other than droplet infections; and (*d*) the diagnoses of all cases of droplet infections. All returns were then correlated by the brigade S.M.O. and shown as incidence per 1000 personnel in sprayed and unsprayed groups. The returns were corrected for variations in strength of batteries.

RESULTS

During the period under review the total number of cases of droplet-borne diseases reporting sick in the sprayed community amounted to 425, compared with 670 in the unsprayed group. The difference of 37% does not merely reflect a difference between the general sick-rate in the two groups, as is demonstrated by the fact that the non-droplet sick-rate in each is almost exactly the same, amounting to 834 in the sprayed and 850 in the non-sprayed (fig. 1). A graph (fig. 2) of cases of droplet infection in each week per 1000 personnel shows that the difference between sprayed and unsprayed groups is greatest during the period of maximum incidence of droplet-borne disease. The curves meet at the end of the experimental period when epidemics of influenzal colds had died down. It is significant that the outlines of the two curves follow each other fairly closely.

There were no complaints of damage to clothing or metal parts of weapons by the bleach spray. Sprayers of various makes but of similar design were used and it was found that some of them became unserviceable by rust on plungers and corrosion of containers. The better, but not necessarily more expensive, type of sprayer has a piston and piston shaft constructed of rustless material. The well-constructed container of galvanised iron which is associated with this will stand up to the corrosive effect of bleach solution for one season in most cases. In the event of spraying being used on a large scale a non-corrodable material should be used.

1. Andrewes, C. H. *Lancet*, 1940, **2**, 770.

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MODE OF ACTION

In an attempt to determine how the spray acts, the assistance of Dr. C. P. Stewart was enlisted and an apparatus was constructed to aspirate a measured volume of air (about 20 litres) through a solution of potassium iodide to detect chlorine by the liberation of iodine. The apparatus is capable of detecting 0·01 mg. of chlorine in the volume of air taken. The door and windows of the hut were closed and spraying carried out by the N.C.O. in the normal manner. The air drawn through five minutes later showed no detectable amount of chlorine in spite of the fact that a definite odour of hypochlorous acid persisted. It was observed that the spray droplets appeared to settle rapidly and to dry off on floor walls and window ledges. Dust from these situations was accordingly tested with potassium iodide and starch and in every instance showed the presence of available chlorine. Later experiments under laboratory conditions showed that chlorine could be detected from the dust up to six hours after a single spraying. From these observations several modes of action may combine to produce beneficial results.

A sedimentation effect by spray droplets entangling and carrying down with them the smaller infected salivary droplets.

A direct sterilising effect on the organisms suspended in these droplets.

A further temporary effect in laying and sterilising organisms in dust on the floor.

A slow continuous action by the release of chlorine from the fine deposit of bleaching powder spread over the hut, persisting until renewed by the next routine spraying.

DISCUSSION

At first sight the 37% reduction in the incidence of droplet-borne disease in the sprayed groups looks significant but a detailed study of the figures from individual batteries makes it less convincing (see table).

INCIDENCE OF SICKNESS IN INDIVIDUAL BATTERIES, CORRECTED FOR STRENGTH OF BATTERIES

SPRAYED			UNSPRAYED		
Battery	Non-droplet diseases	Droplet diseases	Battery	Non-droplet diseases	Droplet diseases
A	68	71	G	109	182
B	135	48	H	251	223
C	158	61	I	174	77
D	145	65	J	120	43
E	108	85	K	110	82
F	220	95	L	86	63
Total	834	425		850	670

It is evident that the figures for G and H Batteries in the unsprayed group are largely responsible for the apparent differences between the groups and that if these two batteries were neglected the incidences of droplet disease would be approximately the same in the sprayed and unsprayed group. The figures for G and H Batteries may be explained on one of the following hypotheses: (*a*) A local condition in the batteries concerned, such as a slack or over-conscientious medical officer, a poor level of general health, or low morale among the troops; or (*b*) an epidemic of catarrhal disease involving these two batteries. If any local conditions had been responsible the level of non-droplet sickness in these two batteries should have been correspondingly high. This is not so. H Battery, with a very high non-droplet and droplet rate, may usefully be compared with F Battery in the sprayed group which shows an almost equally high non-droplet rate with a reasonably low droplet rate. G Battery's non-droplet rate is not abnormally high and it is interesting to compare it with the figures of D Battery in the sprayed group. G and D Batteries belong to the same regiment, occupying adjacent areas of a strictly comparable rural type of country, without special exposure to infections. G showed a very high droplet rate while D, with a much higher general-sickness rate, had roughly a third of G's droplet rate. The conclusion is that the high incidence in G and H Batteries is the result of local epidemics of catarrhal disease. It is perhaps significant that two out of six unsprayed batteries suffered in this way while none of the sprayed batteries, even though in areas closely adjacent to the affected batteries, were involved.

SUMMARY

A controlled experiment using the most elementary and simple form of spraying with a hypochlorite solution affords some evidence that this method is capable of diminishing the spread of droplet-borne infections within a unit. The method achieves its best results during epidemic periods.

We are indebted to Major J. L. Cowan, R.A.M.C., for assistance in the earlier stages of the investigation and to the regimental medical officers of the brigade without whose coöperation this experiment could not have been carried out.

BIOPSY OF THE ENDOMETRIUM

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FOR some years American gynæcologists have been obtaining biopsy specimens of the endometrium for histological examination without anæsthesia as an outpatient examination. In this country a small number of gynæcologists have adopted this practice, and it is the purpose of this communication to put on record my experience of 238 biopsies in 84 patients over a period of a year at St. Bartholomew's Hospital in the hope that the safety and efficacy of this simple and convenient method of investigation may recommend it to others. The number of cases is not great, since the war curtailed the work, but the figures are adequate for the conclusions drawn.

Most curettage operations are undertaken for purposes of diagnosis; but if exact information of the behaviour of the endometrium is to be obtained it is important that the curetting be done at a definite phase of the menstrual cycle. Pressure on hospital beds and the size of the waiting-list seldom allow of this exact timing, and often the bed is wasted and the patient is submitted to an operation the results of which are fruitless. Another small point is that the operation is often performed by a junior colleague or house-surgeon who does not know the exact reason for the curettage and who, from inexperience, may obtain a specimen—possibly from the isthmus or endocervix—which is inadequate for histological study. Endometrium most representative of the whole may best be obtained at the fundus, and after a little practice an operator of average dexterity will almost always procure his specimen from this region; moreover, he will know by inspection whether he has secured a useful piece or must explore a second time. In this way, always seeing the same cases and always operating himself, he is sure of the exact continuity of his specimens which is essential in diagnosis and in the ultimate histological assessment of the results of any given endocrine therapy.

There are at present two methods whereby one may obtain exact information about a woman's menstrual cycle—by serial biopsy of her endometrium, and by biological assay of her hormones, either circulating in the blood-stream or excreted as end-products in her urine. The estimation of urinary pregnandiol is a good example of such biological assay, and its presence at a given time in a given quantity is at least presumptive evidence of ovulation and corpus-luteum formation. This evidence becomes more than presumptive if a biopsy specimen taken in the last week of a 28-day cycle shows an endometrium with well-marked secretory-phase changes in the glands and stroma. As a positive check on the efficacy and the dosage of hormone therapy endometrial biopsy is again extremely valuable, and in many cases in this series it has made it possible to demonstrate œstrogenic and secretory changes in the endometrium where a previous serial biopsy had shown them to be deficient or absent. The method must never be used in an attempt to diagnose malignant disease in the cavity of the uterus. Endometrial biopsy as performed on outpatients has considerable advantages from an economical point of view. An examination that would

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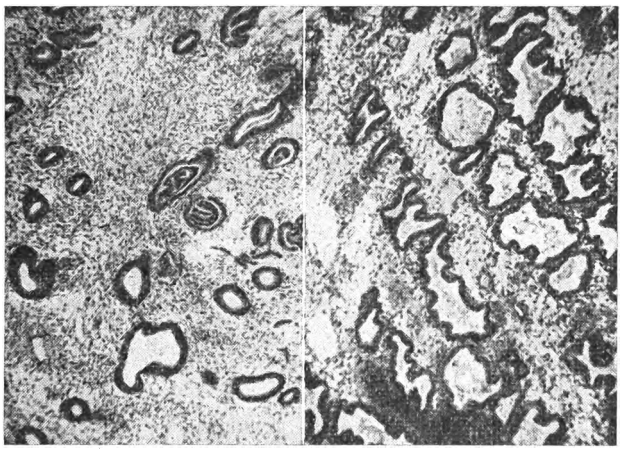
entail the use of a hospital bed for a month, and immobilise a woman who may be extremely unwilling to leave her family or her job, can be carried out in this way equally well and perhaps better without admission to hospital; crowded gynæcological waiting-lists are thus kept free for the more urgent hysterectomies and prolapses.

TECHNIQUE AND RESULTS

The present series consists of 84 patients: 44 cases of sterility, 31 cases of irregular uterine bleeding and 9 cases of amenorrhœa. The total number of biopsies performed in these women was 238, the average number being 2 or 3 in each case and the highest individual score 10; several had 5, 6 or 7 biopsies.



(*a*) (*b*)

Biopsy specimens of endometrium. (*a*) Œstrogenic, (*b*) secretory phase.

The technique is simple. At the first examination a careful history is taken and the menstrual cycle should be plotted on a printed menstrual-history case-sheet. A bimanual pelvic examination is made and a vaginal speculum passed, the cervix being inspected to exclude any organic lesion. Any cervical infection is best treated and eliminated before the performance of endometrial biopsy. If the case is suitable for biopsy the patient is asked to attend on the day chosen with reference to her menstrual chart, and it has always been my practice to explain what the examination entails and the reasons for it, thereby ensuring the patient's coöperation and confidence. No shaving of the vulva and perinæum is necessary, but the patient is instructed to have a bath on the morning of operation after cutting the pubic hairs reasonably short. When the biopsy is to be taken she is placed in the lithotomy position; the vagina and cervix are well cleaned and the vagina swabbed out with Dettol. The operator should wear a mask, gown and rubber gloves, which are kept in a special drum in the outpatient clinic. A small Auvard's speculum is introduced and the sister retracts the anterior vaginal wall if necessary. The cervix is grasped with light fine volsella and gently steadied, and a small malleable sound is passed to ascertain the direction and size of the cervical canal; occasionally this is narrow and one or two small dilators may then be passed. A fine sharp curette is introduced and a specimen of endometrium obtained from the fundus.

With practice, the whole proceeding takes only a few minutes and the quicker it is done the less likely is the patient to be worried by it. No special instruments are required and in all these cases a small fine ethmoid curette was used and proved itself a trusty and efficient instrument. No special suction curette was ever used. All the instruments are sterilised by boiling for each case, and if the pressure of work is severe they can be duplicated to save time. After the examination the woman is sent to dress and always interviewed before she leaves hospital to make sure that she is feeling no ill effects. She is also warned to expect a faint show for 24 hours or so and assured that this is normal.

The pain experienced varies in different women. The cervix, like most hollow viscera, can be cut and burned by the cautery with relatively little discomfort in the conscious patient, but she rather resents it being stretched. The passage of a dilator is usually commented on and in some cases complained of as painful, though seldom as severely so; hence it is important to use a small instrument. In two of my cases, both nulliparæ, it was impossible to pass an instrument into the cervical canal and these cases had perforce to be put on the inpatient waiting-list. Needless to say, unmarried or virgin patients are as a general rule unsuitable for biopsy without hospital admission. Considering the series as a whole, pain and discomfort during the operation provided a contra-indication in very few patients. Of other minor ill effects, one patient had a mild syncopal attack and nearly fainted and one was sick. These symptoms occurred in the earlier cases; with increasing experience and dexterity untoward effects were rare.

In assessing the value of this method of investigation the main criterion is the histological information obtained. A biopsy specimen may be said to be satisfactory if it contains a fair-sized piece of endometrium showing the stromal and glandular pattern clearly, so that study of it will definitely place the endometrium in a given category—typically œstrogenic (fig. *a*) or typically secretory (fig. *b*). With a good section there will be no doubt or hesitation in so placing it. In this series 210 of the 238 specimens were classed as good, 18 as adequate, and 10 as useless. In this last class are included those sections which contained no endometrium, or only cervical mucosa. There is a notable improvement in the proportion of good specimens among the later cases of the series and this is of course the result of practice.

SUMMARY

Biopsy of the endometrium has been performed 238 times in 84 outpatients.

It is a simple and safe procedure that can be conducted without anæsthesia or premedication and without remarkable discomfort to the patient.

The technique used is described; it requires no special instruments and only average skill on the part of the operator.

Judged from a histological standpoint, the specimens obtained provided the information required in all but 10 out of a total of 238.

Biopsy of the endometrium provides exact knowledge of the functional state during any given menstrual cycle, and is particularly useful in cases of sterility and irregular uterine bleeding. It also enables a check to be made on the results and dosage of hormone therapy.

It allows of a great saving of time and money to patient and institution.

I wish to thank my seniors at St. Bartholomew's Hospital, Dr. Malcolm Donaldson, Dr. Wilfred Shaw and Dr. John Beattie for their help; and Mr. B. Cambridge, for cutting and staining all the sections.

TOXICITY OF PHENOTHIAZINE

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THE use of phenothiazine (thiodiphenyl-amine) in the treatment of threadworms was first suggested by Manson-Bahr (1940). He recorded successful results in 6 children and 3 adults, and advised that children under four years should be given 1 g. daily for seven days, children between four and eight 2 g. daily for seven days, and adults 8 g. daily for at least five days. de Eds, Stockton and Thomas (1939), who have investigated the pharmacology of phenothiazine, reported that out of 19 patients in whom blood-counts were made before and after medication with phenothiazine, 3 developed an anæmia. These 3 patients had taken a total dosage of 22·4, 28·1 and 19·9 g. respectively; in the third patient the red-cell count dropped from 4,410,000 to 1,570,000, with reticulocytes increased to 35%. No toxic effect on the leucocytes was observed. They discovered no undesirable effects from the drug in the gastro-intestinal tract, kidneys or liver. The 11 patients on whose serum the van den Bergh test was done all showed a positive indirect reaction; this reaction was attributed to the colour of the dye in the blood-serum. They recommend that, in view of its effect on the red cells, the maximum total dose of phenothiazine should not exceed 15 g.

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without a rest period. If this dose is adjusted for body-weight it represents less than half the doses suggested by Manson-Bahr for adults and children.

Phenothiazine was sent to me by Dr. C. M. Scott for clinical trial and I have used it, in a preliminary investigation, in 8 children. In one of these (case 1) poisoning occurred.

CASE 1.—Girl, aged 12 years. Weight 78 lb. Referred from the school clinic for treatment of threadworms on July 3, 1941. Phenothiazine 4 g. for seven days prescribed. On July 10 the child was jaundiced with a furred tongue. Her mother stated that for three days she had been ill; her chief symptoms were nausea, anorexia, insomnia and depression. On July 17 jaundice had faded, but she was obviously anæmic and a blood-count showed red cells 2,900,000; Hb. 60%; white cells 8900 per c.mm.; neutrophils 44% (3916), lymphocytes 53% (4717) and monocytes 3% (267). On the 24th, after a week's treatment with iron, a blood examination showed red cells 3,330,000; Hb. 68%; C.I. 1·02; average diameter of red cells 7·6 μ; white cells 4300; platelets 300,000; volume of packed red cells 36·9% of blood-volume; mean corpuscular volume 110·8 c.mm. (normal 78–94 c.mm.; average 86 c.mm.); eosinophil polymorphs, 2% (86); monocytes 2·5% (108); lymphocytes 50% (2150); neutrophil polymorphs 45·5% (1956); neutrophil nuclear index:

Patient	i, 46;	ii, 46;	iii, 8;	iv, 0;	v, 0
Normal	12	25	25	15	4

Red cells show little variation in size and shape; no stippled or nucleated reds seen; reticulocytes number about 10% of the red cells.

Urine.—Acid, no albumin, no sugar, microscopically clear; no blood pigments, &c., present. Van den Bergh negative.

Complete recovery occurred in one month from the onset of symptoms.

The effects of phenothiazine poisoning in this child were shown by the anæmia and jaundice. It is improbable that the jaundice was hæmolytic in origin, since the anæmia was not sufficiently profound for this; moreover, the clinical condition of the child was strongly suggestive of a hepatitis. This toxic effect on the liver has not been previously reported, but it might have been forecasted in view of the chemical structure of phenothiazine. It is well known that substances containing benzene, such as trinitrotoluene, dinitrobenzene, dinitrophenol and arsenobenzene derivatives, are poisonous both to the liver and the blood elements. As has been suggested above, no help in the differential diagnosis of the jaundice can be expected from the van den Bergh test, which gives an invariable positive indirect reaction when phenothiazine is being taken. The blood-picture in this child showed a severe degree of anæmia and a leucopenia, with evidence of active hæmopoiesis in red cells and neutrophils.

Of the other patients treated with phenothiazine, blood examinations were made before and after treatment in 2 and in one there was evidence of a moderate anæmia.

CASE 2.—Boy, aged 5 years. Weight 38 lb. Referred from the school clinic for treatment of nocturnal enuresis on July 24, 1941. He was found to be suffering from threadworms also. His blood examination made before treatment with phenothiazine showed: red cells, 4,600,000 per c.mm.; Hb. 83%; reticulocytes less than 1%; eosinophils 2000 per c.mm. He was given 0·5 g. phenothiazine three times a day for a week. Blood examination then showed: red cells 4,000,000; Hb. 72%; C.I. 0·9: average diameter of red cells 7·6 μ; white cells 7000; platelets 200,000; cell volume 37·5% of blood-volume; mean corpuscular volume 93·75 c.μ. Red cells show relatively little variation; about 3% are reticulocytes. Eosinophil polymorphs 13% (900), neutrophil polymorphs 33% (2320), lymphocytes 51% (3570), monocytes 3% (210).

Urine.—Some epithelial cells. Very few leucocytes present.

No threadworms were seen after four days' treatment, but eosinophils were still high at 900 per c.mm.

Judging by the American series quoted above, poisoning may be expected in a fair proportion of cases if a total dosage of more than 15 g. is administered to adults. This does not include instances of idiosyncrasy which have not yet been reported but which may be expected to occur rarely. Since evidence of poisoning was discovered in 2 of these 8 children, I decided to assess total dosage in future by body-weight. Accepting the American standard of 15 g. for an approximate weight of 150 lb., 1 g. for every 10 lb. of body-weight was used as the total dose. This amount was spread over 3–5 days and if the threadworms had not entirely disappeared a second course was given a week later. More than 20 children were thus treated, several of them required the second course but all of them were declared by their mothers to be free of threadworms. One child was stated to be depressed and another off her food while under treatment. No further evidence of toxicity was discovered until the last case of the series.

CASE 3.—Girl, aged 2½ years. Referred from the school clinic for treatment of threadworms. Weight 29 lb. Phenothiazine 1 g. for three days prescribed. On the second day of treatment the child was sick and lacked appetite; on the third day the mother noticed that the child was yellow. The next day, on examination, jaundice was confirmed; the liver was enlarged to just above the umbilicus and appeared tender; the urine was red with the excreted dye. Blood examination on the fifth day showed: red cells 41,200,000; Hb. 75%; C.I. 0·89: average diameter of red cells 7·55 μ; white cells 9300; platelets 400,000; eosinophil polymorphs 7%; basophil polymorphs 0·3%; neutrophil polymorphs 24·3%; lymphocytes 63% (5859); monocytes 5·3% (493); neutrophil nuclear index: Patient: *1*, 62; *2*, 30; *3*, 8; *4*, 0; *5*, 0. Normal: *1*, 12; *2*, 25; *3*, 44; *4*, 15: *5*, 4.

A week later the child's general health had improved; her appetite was normal and the liver was smaller but the conjunctivæ were still bile-stained. This child's blood showed a mild anæmia with moderate stimulation of hæmopoiesis. She was undoubtedly suffering from a toxic hepatitis.

EFFICACY OF PHENOTHIAZINE

The employment of a potentially toxic drug in the treatment of a comparatively trivial infestation requires justification. Although trivial, infestation by oxyuris vermicularis is very common; large-scale investigations in lower and middle class white children in Washington D.C. gave a 50% incidence in children from six to eighteen years of age. No comparable investigation has been made in this country; it is a formidable research, because routine examinations of fæces are without value and the eggs have to be sought in peri-anal smears. The ordinary clinical standard of cure is a statement by the mother that she can no longer see threadworms in the child's fæces. This standard is frequently shown to be faulty by the re-emergence of threadworms, sometimes years later. Assessed even by these standards, the uniformly effective drug has not yet been discovered. Hexylresorcinol, as employed in an elaborate technique by Brown (1932), gave complete success judged by the highest standards. Wright and Brady (1940) obtained 60–90% cures in adults and children with gentian violet by mouth. It is probable that Butolan and its more recent equivalents which have been widely used in this country have a comparable efficiency with gentian violet.

It is unfortunate therefore that phenothiazine which appears to be completely successful in the treatment of threadworms should sometimes be toxic to the host even in small doses. Consideration of case 3 suggests that it will be wise in future to restrict its use to cases where less dangerous therapies have repeatedly failed. Its administration should then be strictly supervised.

SUMMARY

Phenothiazine has been shown to be an effective remedy against threadworms in more than 30 cases.

Phenothiazine is poisonous to the blood and the liver in much smaller doses than have been suggested for the treatment of threadworms. Three cases of anæmia following its use have already been recorded in the literature and 3 further instances are given here. In 2 children it also produced a toxic hepatitis.

Phenothiazine is probably too dangerous a remedy to be used in the routine treatment of threadworms.

I am grateful to Dr. G. R. Osborn, pathologist to the hospital, for the pathological investigations recorded and to Dr. C. M. Scott, of Imperial Chemical Industries Ltd., who supplied me with phenothiazine.

REFERENCES

Brown, J. (1932) *Proc. Soc. exp. Biol., N.Y.* **30**, 221.
de Eds., F., Stockton. A. B. and Thomas, J. O. (1939) *J. Pharmacol.* **65**, 353.
Manson-Bahr, P. (1940) *Lancet.* **2**, 808.
Wright, W. H. and Brady, F. J. 1940 *J. Amer. med. Ass.* **114**, 861.

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INSULIN HYPOGLYCÆMIA

CHANGES IN NERVOUS MANIFESTATIONS

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CHANGES in the symptomatology of insulin hypoglycæmia in diabetics commonly occur as years of treatment go on and insulin reactions may differ so much from the original ones that patients are dangerously unaware of their onset. At first it is almost the rule that patients feel and easily recognise minor premonitory symptoms. These can be ascribed mainly to reactions of the *autonomic nervous system* and are akin to the effect of a dose of adrenaline; indeed they are probably due to an extra secretion of adrenaline produced in an attempt to mobilise stored glycogen into blood-sugar. Such symptoms are general weakness and faintness, tremors, sweating, hot or cold feelings and palpitation. Other early symptoms, less easily explained by hyperadrenalinæmia, are hunger pains, visual disturbances including diplopia, and tinglings, especially of the lips and tongue. Such symptoms occur, if at all, at definite times of the day or night, at the period of maximal insulin action, and are easily recognised and removed by eating 1–3 lumps of sugar. Many conscientious patients even welcome such mild attacks occasionally, regarding them as a sign that their diabetes is well controlled. Such symptoms indicate as clearly as an exact estimation that the blood-sugar is between 50–70 per mg. 100 c.cm. Should such symptoms be unrecognised or neglected, so that glycopenia persists for a long time, symptoms develop which may be classified, roughly at least, as being due to disturbed function of brain and *central nervous system*; these are mental confusion, symptoms exactly simulating alcoholic intoxication, muscular twitchings, convulsions, epileptiform seizures, transient hemiplegias and complete coma. All these effects disappear rapidly, and usually completely, on restoration of the blood-sugar; but they occasionally persist longer, especially if hypoglycæmia has lasted for one or more hours, and, very occasionally, there is permanent hemiparesis or mental impairment with definite histological changes in the nerve-cells. A few patients never feel early premonitory symptoms but experience the more serious group of symptoms from the start; yet considering the large number of stupid or careless patients on insulin treatment, serious attacks and sequelæ are exceedingly rare.

As years of insulin life go on, sometimes only after 5–10 years, I find it almost the rule that the type of insulin reaction changes, the premonitory autonomic symptoms are missed out and the patient proceeds directly to the more serious manifestations affecting the central nervous system. This applies to diabetics who have been continuously on unmodified soluble insulin as well as those who have been changed to protamine insulin, whose different, slower and more prolonged action often modifies the type of reaction. The following are typical of the changes I refer to. A patient, instead of becoming shaky, sweating, or hungry if his meal is unduly late, becomes suddenly confused and obstreperous, creates a scene and refuses sugar. Another, accustomed to drive a car and usually warned of hypoglycæmia by slight diplopia, becomes suddenly wild and unbalanced in his driving. Yet another, instead of being wakened at night by violent palpitations—his warning to take sugar—goes straight into convulsions and awakens so paralysed that he cannot reach his sugar. The same patient may at one time experience early premonitory symptoms and at another be quite unaware of an inpending attack. It is obvious that these are serious dangers.

I can offer no satisfactory explanation of this change of symptomatology and the common failure of autonomic warning symptoms as time goes on. I have noticed how, at the beginning of insulin treatment, patients feel hypoglycæmia symptoms at a higher blood-sugar level—90 to 120 mg. per 100 c.cm.—than later on, when they may not experience the same feelings until the blood-sugar is 40–60 mg. per 100 c.cm. Here we may say that the tissues become attuned to a lower level of sugar concentration. But the condition I refer to occurs in patients who are often hyperglycæmic and only rarely hypoglycæmic. It is no mystery that if the blood-sugar is low for long enough the central nervous system should react in some untoward way, because if sugar is, as we believe, the only fuel it can use the absence of this fuel must interfere with its vital function. It is also known that the higher cortical functions and centres suffer first and most severely, and that the function and anatomy of the basal ganglia and vital centres are rarely affected. But none of these facts explains why symptoms of upset of autonomic type fail to give warning of trouble as years go on.

I know of no way by which the original sensitivity of the autonomic nervous system can be re-established and the danger of serious hypoglycæmia entirely prevented, but certainly the urine in such diabetics should never be made continuously sugar-free throughout the 24 hours. If they are sugar-free at the time of minimal insulin activity—say after breakfast—they run an almost certain risk of hypoglycæmia at the period of maximal insulin action a few hours later. The most certain way of avoiding trouble in such cases is to give regularly a large carbohydrate buffer (20–30 g. of carbohydrate) before these times of intense insulin action, to anticipate and prevent hypoglycæmic attacks. With soluble insulin this carbohydrate should be given 3 hours after each injection; with protamine insulin it should be given at tea-time if the interval between lunch and supper is a long one, and in all cases at bed-time.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the Section of Surgery on Nov. 5, with Mr. E. ROCK CARLING, the president, in the chair, a discussion on

Streptococcal Cross-infection in Wards

was opened by Prof. A. A. MILES. Such infection, he said, was an established phenomenon, but seldom gave rise to severe and fatal infections. The common results were cellulitis, erysipelas, extension of wound infection, delayed healing or failure of skin grafts. Of the bacteria commonly taking part *Streptococcus pyogenes* was most easily traced; and though not the commonest cross-infecting organism it was the most important because of its pathogenicity. The incidence of streptococcal cross-infection depended on sources of infection in wounds and upper respiratory passages, on the possible channels of infection, and on the state of the exposed tissues. In the surgical ward of peace-time, the streptococcal reservoir was mainly in the upper respiratory passages, and striking cases of infection were rare. In war-time, wounds infected before admission provided additional reservoirs, and hospital infection was commoner because of this and because of the greater susceptibility of the war wound compared with the operation wound. Poor accommodation and hastily trained staff also played their part. Peace-time technique might prove inadequate to meet the added risks of war. Infection could reach the wound by three main channels—dust, droplets, and transference of organisms on hands and utensils. These possible channels of infection demand separate precautions, which Professor Miles divided into those associated with the actual dressing technique, and others. Among the latter were the use of impermeable masks to prevent droplet-infection, and the exclusion from the ward of anyone with an infected hand or finger. Common utensils should be disinfected every time they were used by an infected patient, and all his things should be kept separate, as far as possible, from those used by other patients. His wound should always be kept covered between dressings. There should be a quiet period in the ward before dressings were begun; bedmaking should cease so that dust could have time to settle. The dressings themselves should be carried out by a team consisting of a trolley attendant who had nothing to do with the patient but simply handed out sterile materials with forceps; a dresser, who used a "no-touch" technique; and an assistant. The dresser and assistant treated each case as a separate unit, washing their hands and having the instruments freshly sterilised between each dressing. They should, if possible, wear fresh dry gloves for each case; the wet scrubbed hand, with infection trickling down from the forearm, should not be

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used. Bacteriological surveys often revealed defects in dressing technique. Professor Miles said he had made an investigation, with Dr. Joyce Wright, of the incidence of cross-infection in a ward containing both air-raid casualties and operation cases; during the first period an ordinary dressing technique was used, and during the second the team-technique was used, masking was compulsory, and there was a quiet period in the ward before dressings were begun. Results were as follows:

	Air-raid casualties	Cross-infection	Operations	Cross-infection
1st period	32	10	46	2
2nd ,,	46	1	49	0

In both periods 10 heavily infected cases were admitted, so that the menace was about the same; but the revision of technique reduced cross-infection from about 15% to 1%. Improved aseptic precautions did not entail an increase of medical or nursing staff, and the speed of teamwork made up for the time lost by employing several people on one dressing. More bacteriologically controlled surveys were needed to test the effect of prophylactic methods, and to establish that cross-infection was important even in wards where its effects were not obvious.

Prof. J. PATERSON ROSS remarked that this "fiddle-faddle" of aseptic technique—as Clifford Allbutt had called it—must be attended to. Simple precautions could be taken against dust and droplet-infection by shutting windows and stopping bedmaking an hour before dressings were due to begin. Receptacles containing dressings should have lids to them, and the wound must be left uncovered for the minimum time. Masks must be not only impervious but large enough to cover the nose and chin and stretch a good way to the sides; they should measure 6 × 8 in. at least. In order to prevent contact infection forceps should be used or gloves worn; hands and instruments should be dry, and the fingers of the dresser should never touch the wound, the skin round it, or the dressings next the skin. Palpation round the wound could be done, if necessary, with a piece of wool held in the forceps; and where it was impossible to dress a wound entirely with forceps—as might happen with an empyema wound—the patient should be taken to the theatre and dressed with full theatre technique. In the wards separate packets of dressings might be used for each patient and opened with forceps on a sterile towel spread on the top of the trolley; the dresser could then take what he needed instead of having it handed to him, and the clean trolley attendant need only hand him the sterilised instruments. All instruments should be boiled; the edge of a cutting instrument was not spoiled if it was properly wrapped while boiling. Two minutes in boiling water sufficed if instruments had been properly washed. Bowls and irrigating cans should be immersed during boiling. Antiseptic solutions should be checked to see whether they were used strong enough and long enough; spirit could not be trusted. These methods were neither new nor elaborate: they were merely a revival of aseptic technique. It was well to try to oil floors and treat blankets to prevent the spread of dust, but if these measures were not practicable surgeons must make sure that dressing drill was properly learned. The wound which failed to heal by first intention was more liable to cross-infection. It was unreasonable, he said, to use a good technique in the theatre, and a bad one in the ward. In outpatient departments, too, all the rules were broken. Surgeons must teach their students that the quick glance at a wound was dangerous, inviting droplet infection. Indeed, any removal of the dressing was dangerous. He thought that in future we must look forward to a special dressing-room opening off the ward. The tendency was to dress wounds too often, as closed-plaster technique had shown. But it must not be forgotten that organisms could get in and out of plaster, and could be disseminated when a plaster was changed. The Medical Research Council memorandum No. 6 suggested that an asepsis officer should be appointed in large hospitals; but Professor Paterson Ross felt that the surgeon in charge of a unit must be responsible for the technique in that unit; he could always count on help from the bacteriologist. To achieve an aseptic conscience was better than being shadowed by an aseptic policeman.

Dr. M. VAN DEN ENDE held that in general surgical wards cross-infection of wounds occurred mainly through contact, and a careful dressing technique would reduce the incidence. In ear, nose and throat wards, or scarlet-fever wards, the upper respiratory tract was of course more liable to be the source of infection. This region, which trapped bacteria from more than 10 cu. ft. of air per hour, was specially likely to harbour organisms if it had recently been the site of an operation. We were not yet clear, he said, about what constituted a danger. If one streptococcus was enough to produce a cross-infection then dust was dangerous; if 1000 streptococci were needed that danger was slight. But there was danger of dissemination by droplets even in a general surgical ward. The nurse with an upper respiratory infection should be sent on leave. Patients with such infections had been shown to deposit large numbers of organisms on the bedclothes near the head, and these were disseminated during bedmaking. Photographs of sneezers showed the distant projection of droplets, and gauze masks might not intercept these. Cellulose-acetate masks should therefore be used. Large droplets carrying infective doses had a relatively short range and fell to the ground rapidly; adequate bed spacing and masking dealt with them effectively. During dusting and bedmaking the number of organisms in the air of a ward were at their peak, and they could remain suspended for long periods. Treatment of the floors and bedclothes with dust-laying oils reduced the numbers successfully. For 1000 sq. ft. of floor 1 gallon of spindle oil was needed. It looked dull, but the nurses got used to it, and if the excess was removed it was not slippery. It was not bactericidal, and no suitable antiseptic had yet been found to mix with it, but efforts were being made to find one. Technical white oil could be used for bedclothes, and could be applied in the hospital laundry. He thought that tests were urgently needed of the value of dust-laying methods in reducing cross-infection, especially in scarlet fever, diphtheria and ear, nose and throat wards.

Colonel LEONARD COLEBROOK described two cases in which a general infection had been acquired from dust. He then traced the events following admission to hospital, in January, 1941, of a patient with severe burns infected with a type 12 streptococcus which was resistant to sulphanilamide. He was nursed in a bathroom 18–19 yards away from the ward first affected, and he ultimately died. Subsequently 14 cross-infections from his organism were identified, in 6 of which skin grafts were lost or went wrong as a result, while in the remainder there was infection of healing wounds, delayed healing or cellulitis. Every effort had been made to check spread—floors had been oiled and gloves and masks worn. The fact that the organism was sulphonamide resistant might have been partly responsible, and it might have other properties which made it particularly invasive. There had been hardly any acute throats in the affected wards. He believed that cross-infection was a bacteriological problem and should be dealt with by bacteriologists, and he favoured the idea of an asepsis officer, believing he could succeed in getting the facts over to students and nurses. If it was left to the surgeons there would be spurts of enthusiasm followed by lapses. It would be better to begin by having imperfectly trained asepsis officers than none at all. They should take the nurses into the laboratory and let them make cultures and learn a little first-hand bacteriology: their interest was a revelation.

Sir JAMES WALTON reminded the meeting that in this war we had had practically no experience of gross infections. Patients with bomb lacerations were operated on as soon as they got over the shock; their wounds were treated with sulphonamide and left for ten days, when they were found to be healing with clean granulation tissue. But if war came into this country we should see gross infections. Every medical officer must learn to adapt himself to what he could get. It was possible to dress wounds entirely without touching them, and thus without washing between cases. A man could not dress 40 cases, washing between each; but he could go round with forceps, using a separate packet of dressings and freshly sterilised instruments for each patient and never touch a wound. He had been inspecting many hospitals and had found none where dressing with forceps was compulsory. Ear, nose and throat cases should not be nursed in general surgical wards.

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Dr. W. A. BRADLEY had followed the spread of *Strep. pyogenes* infections in Addenbrooke's Hospital and had found different types prevalent at different times. Thus types 8 and 3 were prevalent in some wards at the beginning of the investigation, but they had then disappeared for some years. At other periods he found types 6 and 22. Outbreaks of a single type would last about three months and spread slowly; often just when a general spread seemed imminent that type disappeared spontaneously. After a time it became possible to tell how a strain came in: type 6, for example, was introduced by a case of cellulitis. He found it hard to suppose that dust or bedclothes infections played more than a minor part in spread. In a public school which he had investigated spread of infection seemed to be related to the placing of beds in the dormitories, not to exposure to dust in playrooms and corridors.

Lieutenant-Commander JOHN BUNYAN said that organisms grown from a wound had no significance unless they were causing symptoms. If the wound was encouraged to heal from the start contamination by bacteria became less important. The use of the Stannard oiled silk envelope made it very difficult for secondary infection to occur. The envelope could be applied immediately by anyone and left in position for three weeks. The wound could be treated by irrigation with electrolytic hypochlorite solution. If the wound was healing well inside the envelope the type of organisms to be found outside became merely academic.

Dr. E. T. C. SPOONER described a study carried out at Hill End Hospital from November, 1940, to April, 1941, inclusive, in a plastic surgery ward. Swabs were taken from wounds and throats, and it was found that 65% of wounds were infected with hæmolytic streptococci, and that a quarter of these infections began while the patients were under observation. In one epidemic due to a type 13 organism, 3 throats and 15 wounds were infected (one wounded man was seriously ill and 4 Thiersch grafts failed). A type 4 epidemic, starting from 5 burns infected with the same organism admitted together from the same hospital, spread to 18 throats and 4 wounds. The type 13 organism had been found by Colonel Colebrook to be resistant to sulphanilamide, whereas the type organism was susceptible to the drug. All wounds were being treated with sulphanilamide powder. This experience illustrated the need for continual investigation which alone could give that fresh insight likely to extend what was known about the control of infection.

Mr. H. W. RODGERS said that he had been attempting to reduce the smell of the closed plaster method of treatment by enclosing a sheet of gauze soaked in strong antiseptic between the layers of the plaster. This, besides preventing the smell from becoming serious for three weeks, retained much of the pus seeping from the wound. He asked whether it would also have an effect in preventing cross-infection. Professor MILES replied that on general principles a layer of strong antiseptic might be expected to reduce the number of bacteria coming through the plaster.

Reviews of Books

Warwick and Tunstall's First-aid to the Injured and Sick

(18th ed.) Editor: NORMAN HAMMER, M.R.C.S., late R.A.M.C., county surgeon, St. John Ambulance Brigade. Bristol: John Wright and Sons. Pp. 336. 3*s.* 6*d.*

THIS is an advanced ambulance handbook. Part 1, on anatomy and physiology, is well written, and gives much more information than that usually found in first-aid textbooks. Part 2 has been largely rewritten, and includes notes on air-raid casualties, war gases, transport and methods of blanketing a stretcher. Busy doctors faced with fallow and inquisitive first-aid classes will welcome it as a reference book. Others may argue that first-aid should never be an advanced subject: that its greatest value lies in its limitations. The great surgeon and the St. John Ambulance man are brothers by the roadside, and perhaps there is a growing tendency today to teach too much in the name of first-aid; reports by competent authorities tell of dangers too. Should we not be wiser in these days of war to teach the greatest number of people the simplest facts of common sense that save life?

The book is full of excellent suggestions and explanations; but ancient illustrations, depicting self-conscious gentlemen of bygone days, have become the depressing but inevitable trade mark of first-aid textbooks. Clear illustrations are an immense help to the student. May we hope in the future for clear line drawings of artistic merit, and more of the type of illustration shown on page 199?

Biologic Fundamentals of Radiation Therapy

FRIEDRICH ELLINGER, M.D., research fellow, radiotherapy department, Montefiore Hospital, New York City; formerly privatdozent in radiology, University of Berlin. London: H. K. Lewis and Co. Pp. 360. 30*s.*

THIS is a comprehensive survey of the literature of all types of radiation used in medicine—ultraviolet light, X rays and gamma rays. The action of radiation on the cell is considered first, followed by an important section in which the action of X rays and gamma rays on the tissues of the human body are described in detail. The effect on the skin is regarded as being of special importance because it was the biological indication used in all the earlier methods of estimating dosage, and because the production of irreversible reactions in the skin limits the dose which can be given through any external portal. Different organs and tissues are considered and much experimental work is quoted. The chapters on the therapeutic uses of radiation are less satisfactory because the task is more difficult. In the last twenty years the science and practice of radiology have been changing so quickly that opinions firmly held a few years before may be regarded as out of date even by the author who originally published the conclusions; and the selection for quotation of work based only on reliable experimental evidence is impossible at the present stage. It is not in line with modern thought, however, to include Hodgkin's disease as an infectious new growth, while the closely related and sometimes indistinguishable lymphosarcoma is mentioned in a short section on sarcoma in general as if it were a neoplasm of the skin only. Dr. Ellinger points out that the doses mentioned are merely given for orientation purposes; but they reflect the confusion in practice, including as they do doses in S.E.D., r in air, r on skin with backscatter, skin doses per field and summated dose, and for radium milligramme hours.

Part 2 is concerned with corpuscular radiation, and includes the absorption of emanation and some controversial therapeutic methods, with a short appendix on neutrons. Part 3 deals with ultraviolet light—the changes it produces in the skin, its antirachitic effect and its use in the treatment of tuberculosis. Among other matter in part 4 is a chapter on diseases caused by light, is interesting, but the possible carcinogenic effect of bright sunlight might have received more attention. In the fifth part some general principles of radiation biology and therapy are considered and this provides a convenient summary of opinion on the method of action of radiation, radiosensitivity, the time factor and dosage. There is an excellent bibliography and the whole book will be most useful for reference.

Essentials for Final Examinations in Medicine

JOHN DE SWIET, M.D. Lond., M.R.C.P., assistant physician to Staines Emergency Hospital. London: J. and A. Churchill. Pp. 168. 7*s.* 6*d.*

THIS is a small volume of précis articles arranged under 93 headings in alphabetical order. They are practically specimen answers to "spotted" questions, largely compiled from standard textbooks and recent monographs. The style is succinct and clear; the matter, with occasional exceptions, would be acceptable to orthodox examiners, though some might wish for more emphasis on the relation of anginal pain to effort, and some might wonder how it comes about that "the smaller the dose of zinc protamine insulin the sooner it comes into action." But on the whole the student whose own notes are incomplete will find these useful and reliable for last-minute revision.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 15, 1941

WHAT'S IN THE NATIONAL WHEATMEAL LOAF?

WHEN the Medical Research Council drew up its second memorandum[1] on national flour in the spring of 1941 it offered the nation something new. Never before had knowledge been sufficient to select with confidence a loaf which would look and taste almost like white bread and yet contain such a large share of the best nourishment of the whole wheat grain. The Medical Research Council's specification was definite, and if it had been adhered to and the new loaf had appeared simultaneously everywhere, uniform in character, attractive in appearance and easy to get, and if, just before and during its appearance, an earnest and urgent propaganda campaign had been undertaken, there can be no doubt that it would have found wide acceptance. At least all those people who could be reached through their sense of duty to promote their own health and that of others, or to protect the lives of our merchant seamen, would have responded. Many others would have tried the loaf through curiosity and if the loaf had been palatable would have continued to do a duty found not so unpleasant after all.

Unfortunately, the national wheatmeal loaf was not launched in this way. The millers did not produce the flour to any uniform specification, the bakers often baked it badly or not at all, and many retailers did not stock it and showed no interest when asked about it. The Government propaganda was feeble. Finally, on Aug. 27, 1941, the final blow was struck in one of the Statutory Rules and Orders of the Ministry of Food,[2] which gave the following definition.

> "National wheatmeal" means flour produced in the United Kingdom and consisting of 85% by weight of any of the products of the milling of clean wheat, provided that the remaining 15% of the products of that milling are the substances commercially known as fine wheatfeed and straight run bran; and includes any such flour to which has been added any substance authorised by the Minister to be an ingredient of national wheatmeal."

This definition makes no fine distinction as to selection of the most nutritious parts of the grain, and permits 85% national wheatmeal to consist of white flour with added bran. A glance at the interior of the national wheatmeal loaf as baked in some parts of the country suggests that this is indeed the case. The Medical Research Council, in making their definition of 85% national wheatmeal, chose two special safeguards; the flour was to contain not less than one International Unit of vitamin B per gramme and less than 0·9% of fibre. These two criteria neatly set the limits within which the composition of the flour should fall. The first would prevent the flour being too white (too much refined); the second would exclude the coarse bran and prevent the flour from being too dark and containing too much roughage. This second criterion is the one which safeguards the interests of those who prefer the taste of white bread. It is the bran which contributes the high fibre content, it is the bran whose taste is disliked by those who do not care for brown bread, and it is the bran which imparts the unpopular dark colour and coarse texture. Investigation of the national wheatmeal loaf, as now supplied, has shown that the loaf which is disliked is the one of high fibre content. This loaf is becoming more and more the rule; the national wheatmeal loaf is steadily deteriorating and consequently disappearing. The flour in such national wheatmeal loaves of poor quality is said mostly to come from the few large milling concerns whose representatives claimed that the Medical Research Council's specification for 85% flour would put too great a strain on the small miller. Actually, it seems, the small millers, whose voices are not heard, have made a more loyal effort in the country's interests.

In this conflict between the national and individual interests the millers have thus won the day, and a golden opportunity of furthering the health of the people has been lost. The situation of the national wheatmeal loaf after this defeat is now strategically bad but is it irremediable? A good loaf, made to a strict specification and supported by wise propaganda, might still achieve victory.

1. *Lancet*, 1941, **1**, 703.
2. Emergency Powers (Defence) Order, 1941, No. 1291, Food (Flour). H.M. Stationery Office. 3*d*.

T.N.T.

THE internal combustion engine and the high explosive, trinitrotoluene, belong to the category of doubtful benefits which scientific progress has given to the world, and the doubt is more than doubled when they come together in a bombing aeroplane. T.N.T. has gained great popularity as an explosive since it was first made in the laboratory by HEPP in 1880 and since its adoption by the German military authorities in 1902. As a blasting powder in peace-time it was used for its excellent properties of high stability as an explosive and low toxicity for human beings. It can be hammered or turned in a lathe without exploding, and from the pharmacological point of view the toxic and lethal doses are relatively enormous. Indeed PROSSER WHITE[1] in 1901 showed that dinitrobenzene was more poisonous to animals than trinitrotoluene, and he said that in some factories T.N.T. had been substituted for D.N.B. with great advantage to the health of the workers. This was the attitude towards T.N.T. up to the onset of the war of 1914–18, and paradoxically the "safe" properties of the explosive, because reliance was placed on them, led to a great deal of mischief in the form of poisonings and accidental explosions. In the peace-time manufacture and handling of T.N.T. little trouble is experienced but when war comes the demand for the explosive is enormous, many more workers are exposed to it, longer hours are worked, production is speeded up, new factories are built or adapted, and engineering and managerial skill becomes diluted. It is then that poisoning from T.N.T. becomes a major problem, as was well shown by our experience during the last war.

The first fatality attributed to poisoning by T.N.T. was in February, 1915, and LEGGE[2] describes how at the autopsy he was struck by the jaundice of the sclerotics and skin resembling that seen in poisoning by

1. Prosser White, R. *Lancet*, 1901, **2**, 582, 769.
2. Legge, T. M. Annual Report of Chief Inspector of Factories for 1917, p. 21.

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aeroplane dope or tetrachlorethane. In the summer of 1915 other cases occurred and two more deaths were reported. Energetic steps were taken to investigate the problem and to prevent cases of poisoning. The Medical Research Committee was asked to inquire into the toxicology of T.N.T. and in the meantime LEGGE had warned the factories, on the analogy of experience with the nitro derivatives of benzene, that T.N.T. might be absorbed through the skin or be inhaled as dust or fume, and he recommended that precautions be taken against both these modes of entry. Towards the end of 1915 it became necessary to obtain more information about the prevalence of T.N.T. poisoning and toxic jaundice became notifiable under section 73 of the Factory and Workshop Act, 1901, although T.N.T. also sets up dermatitis, gastric symptoms, cyanosis (methæmoglobinæmia) and aplastic anæmia. LEGGE explained that the jaundice of T.N.T. poisoning was chosen because when a statutory notification of an industrial disease has to be made the doctor and the factory occupier usually need a definite symptom or sign to guide them. An attempt to notify all the forms of T.N.T. poisoning would mean that the figures would include nearly every T.N.T. worker seeking medical treatment for any complaint. The order for notification came into force on Jan. 1, 1916, and 181 cases of toxic jaundice with 52 deaths were notified in that year, whereas in 1917 there were 189 cases with 44 deaths. The greatest number of cases were observed towards the end of 1916 and the beginning of 1917, after which the incidence of toxic jaundice and deaths fell rapidly although many more workers were engaged in the manufacture of T.N.T. and in the shell-filling factories. Writing in war-time LEGGE could not give the precise numbers of workers exposed to the risk of poisoning but he indicated that there were well over 50,000 so employed. In the meantime MOORE,[3] with his colleagues WEBSTER and WYON, had been carrying out in the laboratory and the field a brilliant series of researches which established the fact that T.N.T. made its way into the body more often through the skin than by way of the lung passages or the alimentary tract. Early in the inquiry WEBSTER[4] evolved a chemical method of determining the excretion of altered T.N.T. in the urine (a modification of the test by INGHAM[5] was published in our columns last week), and armed with this the investigators were able to test the efficacy of the preventive measures which were put into force. They also showed that the skins of different individuals had varying capacities for absorbing T.N.T. and letting it through into the blood-stream, and that workers who developed dermatitis rarely showed constitutional symptoms. The colour reaction obtained by Webster's urine test is due not to T.N.T. itself but to a reduction product (2 : 6 dinitro : 4 : hydroxylaminotoluene); on excretion in the urine this is conjugated with glycuronic acid, which shares with the sulphonic esters the task of removing from the body in innocuous form a large number of poisonous substances which are either formed autogenously in the body or are introduced from without. Herbivorous animals show a greater tolerance than carnivora for T.N.T. and man with his mixed diet stands in an intermediate position. Some diets yield more glycuronates or glycuronic esters than others and it seemed important to provide for all workers on toxic nitro compounds a diet with a high yield of these substances—for example, fresh vegetables and fruit. Some resemblance was noted between certain manifestations of T.N.T. poisoning, such as purpura hæmorrhagica, and those of scurvy. It may be noted that in war-time supplies of fresh fruit are restricted.

It would be interesting to know how many cases of T.N.T. poisoning there have been during the present war but no figures were given in the report of the Chief Inspector of Factories for 1940.[6] Last week we published a description by R. M. EVANS[7] of seven cases of toxic jaundice due to T.N.T. in a shell-filling factory. Two of the cases ended fatally and in one of these the patient, who died from acute liver atrophy, had been in contact with explosives for only 3 weeks before the onset of the illness. The second death was from aplastic anæmia which came on 9 weeks after an attack of toxic jaundice had abated. HILTON and SWANSTON[8] in an article on the general aspects of poisoning by tetryl and trinitrotoluene mentioned that they have seen 3 (presumably recent) fatal cases of aplastic anæmia in workers exposed to T.N.T. But we do not know whether the position as regards T.N.T. poisoning is better or worse than it was during the last war. Many are asking, as EDWARD VII asked about tuberculosis—"If preventable, why not prevented?" But the principles of prevention of poisoning by T.N.T. are well known and there can be little doubt that as far as is humanly possible they are being applied. In T.N.T. factories all workers are under close medical supervision and the engineers coöperate to control the dust and fume. But as BRIDGE[9] points out there is still no explanation why some people after a short period of exposure are poisoned by T.N.T. while others working under the same conditions escape. ROBERTS,[10] in urging the need for selection of workers, says that those who are susceptible to T.N.T. may not be protected by even the most satisfactory working conditions and most careful supervision. He suggests that no-one under the age of 19 and no woman weighing less than 105 lb. should be allowed to come in contact with T.N.T., and that anyone with sweaty hands, a history of jaundice or the yellow sclerotics often seen in constipated people should be rejected. He also urges attention to the workers' habits of personal cleanliness—whether they sleep in underclothing that they wear at work, whether they bite their nails, or have long tapering ones. MOORE made some suggestions about the part played in determining susceptibility by both diet and permeability of the skin, which can be tested by rubbing in a measured quantity of T.N.T. and assessing by Webster's test the amount absorbed and excreted in the urine. But, until a really reliable method of pre-employment selection is found whereby susceptible individuals can be kept away from T.N.T., cases of poisoning are to be expected in small numbers even if all other methods of prevention are rigorously applied. Meanwhile workers must not be sacrificed to the exigencies of output by being kept in the workrooms longer than is reasonable.

3. Moore, B. *Spec. Rep. Ser. med. Res. Comm.* 1917, No. 11.
4. Webster, T. A. *Lancet*, 1916, **2**, 1029.
5. Ingham, J. *Ibid*, 1941, **2**, 554.
6. H.M. Stationery Office. Pp. 24. 4*d*.
7. Evans, R. M. *Lancet*, 1941, **2**, 552.
8. Hilton, J. and Swanston, C. N. *Brit. med. J.* 1941, **2**, 509.
9. Bridge, J. C. Annual Report of Chief Inspector of Factories for 1940, p. 23.
10. Roberts, H. M. *Brit. med. J.* 1941, **2**, 647.

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TRAUMATIC DEAFNESS

WHEN man learnt to make noises louder than nature intended his ears to bear traumatic deafness must have made its appearance, and gunfire deafness must have come in with guns, though the first cases reported, according to GOLDSTEIN, seem to have been those of SOLOMON ALBERTI of Nuremburg in 1591, when guns had been in use for some 200 years. The industrial revolution, and particularly the development of heavy industries during the present century, has added another form of traumatic deafness. Long exposure to the louder industrial noises produces temporary, or sometimes permanent, deafness in certain people—so-called boilermaker's deafness. Between 1915 and 1930 most aircraft were of the open-cockpit type and the pilot and passengers were exposed to the noise of the engine and air-screw and also the wind-rush. In this period otologists in various countries discussed a form of deafness which aviators developed as an occupational disease. All agreed that temporary deafness was almost the rule and that permanent deafness was reasonably common. The type of deafness was identical with that found in other noisy occupations, and in fact all forms of traumatic deafness where there is no gross demonstrable lesion of the drum, ossicles or bone are of a similar type, varying only in severity. POLITZER [2] described traumatic deafness as being of the nerve type, and this view is supported by KERRISON.[3] The differentiation from other forms of nerve deafness was first made by BUNCH [4] in an analysis of a number of audiometric tests. In senile deafness there is little loss of auditory acuity for tones up to about 512 double cycles, but thereafter the acuity diminishes almost proportionately to the rise in frequency. Toxic deafness follows a somewhat similar, but usually more intense, pattern. BUNCH found that the hearing in cases of traumatic deafness is fairly normal for frequencies up to 2048, after which there is an abrupt fall in the curve, maximal at 4096 double variations and improving at higher frequencies. A similar finding was recorded by FOWLER,[5] who also formulated the generalisation that the medium-high frequencies are especially sensitive to insult from trauma or toxins. These observations indicate a lesion of the second half of the basal whorl of the cochlea, and confirmation came from an investigation of the microscopic anatomy by CROWE, GUILD and POLVOGT,[6] who discovered that there was atrophy of the organ of Corti at a level above the last 2 mm. of the basal turn. This region corresponds fairly exactly to the opening of the oval window and to the promontory on the inner wall of the middle ear. In other words, that part of the cochlea nearest the external world and first receiving the auditory impulses suffers most damage.

In attempting to avoid deafness due to noise, blocking the external meatus has been advised and used for years. For the less intense and prolonged noises the method is reasonably successful. DICKSON and EWING [7] have recently investigated various methods of protecting personnel engaged in flying modern aircraft or handling them on the ground. The noise with which they were concerned is very loud, lasts for a considerable time and is subject to brief impulsive intensification. In addition to protecting against these peculiar noise properties, the method sought had to permit the reception of intelligible speech. As might be expected, the solution of so paradoxical a problem was not wholly satisfactory. Two forms of protective appliance were investigated —ear-plugs of various materials, and complete helmets. The chief function of the ear-plugs was to reduce air transmission through the middle ear, and of the helmets to insulate the bones of the skull and reduce conduction through the bony capsule. Combination was more effective than either method alone but proved unpractical because of the gross interference with the reception of speech. With both methods there was less protection against noise in the lower than in the higher frequencies, but it has already been shown that the deafness occurs in the medium-high range where it causes the greatest handicap. Both plugs and helmet successfully delayed the onset of aural fatigue but did not abolish it, and this is about as far as it is yet possible to go. However, enough has been discovered to indicate that something can be done at least to mitigate one of the many disabilities resulting from war. More still might be done if these cases were followed up carefully. It would not be difficult to keep men deafened by aircraft noise under observation, to have audiograms done regularly, and to seize any opportunity that fatal accidents offered to secure the temporal bones. A few autopsy specimens, backed by a full history and investigation, might teach us much of the pathology of traumatic deafness and show the way to complete prophylaxis.

1. Goldstein, M. A. Problems of the Deaf, St. Louis, 1933.
2. Politzer, A. Diseases of the Ear, Philadelphia, 1926.
3. Kerrison, P. D. Diseases of the Ear, Philadelphia, 1930.
4. Bunch, C. C. *Arch. Otolaryng., Chicago*, 1929, **9**, 625; *Laryngoscope, St. Louis*, 1937, **47**, 615.
5. Fowler, E. P. *Trans. Amer. otol. Soc.* 1929, **19**, 182.
6. Crowe, S. J., Guild, S. R. and Polvogt, L. M. *Bull. Johns Hopk. Hosp.* 1934, **54**, 315.
7. Dickson, E. D. D. and Ewing, A. W. G. *J. Laryng.* 1941, **56**, 225.

MORE ABOUT PHAGE

THE principle of setting a thief to catch a thief seemed likely to be applicable in therapeutics when first F. W. TWORT and then D'HERELLE found twenty-five years ago that cultures of bacteria in the test-tube could mysteriously disappear and when subsequent work showed that many bacteria, pathogenic and non-pathogenic, were the prey of the propagable lytic substance now known as bacteriophage. The nature of this substance is still in dispute. Most bacteriologists adhere to the view that phage belongs to the virus family, and that there is a multiplicity of phage-viruses each specific for its own bacterial host rather than one omnivorous phage as D'HERELLE maintained. Others follow BORDET in regarding phage as an autocatalytic enzyme derived from the bacterium itself, while others, like LWOW, believe in a gene origin of phage. Whatever its nature, the therapeutist soon found that the promised panacea had once again eluded him, for in both experimental and clinical infections phage proved disappointing. The main reason for its failure was its inactivation by any protein or colloid with which it came in contact, although the use of non-specific phage-lysates of weak potency was probably a contributory factor. Even in the test-tube a sufficient concentration of phage is required to lyse a bacterial culture. EATON and BAYNE-JONES [1] concluded in

1. Eaton, M. D. and Bayne-Jones, S. *J. Amer. med. Ass.* 1934, **103**, 1769, 1847, 1934.

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1934 that the field of phage-therapy was limited to surface infections, whether of skin or mucous membrane, such as pyodermias, urinary and intestinal infections, and both in America and on the Continent phage still enjoys a certain popularity in the treatment of such conditions as boils, cystitis and dysentery. The work done since 1934 has been critically reviewed by KRUEGER and SCRIBNER,[2] who point out that there may be a variety of reasons other than direct lytic action on the pathogen for the apparently beneficial action of phage in both local and systemic infections. For example, intravenous injections of phage-lysates may, in virtue of their content of broken-down protein, stimulate a leucocytosis or produce the condition of protein shock which often helps to overcome a subacute infection. Phage-lysate certainly stimulates the formation of specific antibody to the infecting organism, as GREENWOOD, TOPLEY and their co-workers[3] demonstrated in mouse-typhoid. Sometimes, as in the case of the staphylococcus, the phage denatures the bacterial protein, but any preformed toxin would still be present. More specifically, phage might attack the more susceptible infecting organisms, leaving a less susceptible but also less virulent variant to be overcome by the host's tissue, but GREENWOOD and TOPLEY found when using phage in attempts to control epidemics of mouse-typhoid that a natural variation of this kind hardly ever occurred. Applied locally, as in the treatment of boils, the beneficial effect of phage may again be due to a non-specific stimulus of the host's defensive mechanism, for local applications of bacteria-free nutrient broth have been found to be equally effective.

When these collateral effects are discounted, bacteriophage is still found to act specifically on certain bacterial infections, provided it can be applied in sufficient concentration. The diseases which hold out most promise of success are the local bowel infections—dysentery and cholera—and it is particularly important just now to know what phage can do for these. A great deal of work on the prevention and treatment of cholera with phage has been done in India. MORISON[4] has treated wells in certain districts of Assam with anticholera phage while other districts served as controls, and his results seem promising. In treatment MORISON'S fatality-rates in two large series were 22·6 and 21% for treated cases and 55·6 and 70% for controls, with a greatly diminished secondary case-rate in the families of treated cases. PASRICHA and his colleagues,[5] in a carefully controlled series of hospital cases, recorded only a slight difference in the fatality of phage-treated and untreated cholera, but among bacteriologically positive patients the fatality in the treated group was only 8·3% compared with 20·6% for the untreated. Thus, the evidence is favourable to the continued use of phage both in the prevention and treatment of cholera. In dysentery the position is more controversial. Enthusiasts like COMPTON[6] recommend phage-therapy without reservation and claim dramatic results. From Germany[7] comes a report of the treatment of 32 soldiers suffering from a mild Flexner infection with disappearance of symptoms in 2–4 days: 10 c.cm. of a dysentery polyphage was given in coffee after a preliminary dose of 0·5–1 g. of soda bicarbonate to protect the phage against the destructive action of the gastric juice. Others have claimed that dysentery phage can be used as a prophylactic in local outbreaks of the infection, and the war in the Middle East should provide an opportunity for testing the value of phage in dysentery under controlled conditions. But potent and specific lysates must be used if any success is to be obtained.

Phage has been used extensively in America for the treatment of local suppuration, and indeed ALBEE believed that the healing of chronic osteomyelitis by the Winnett Orr technique is largely due to spontaneous or implanted phage-activity. Phage seems to have yielded good results in peritonitis and intestinal perforation but there it is likely to be superseded by the local application of sulphonamides. In systemic infections it has been applied principally to the treatment of staphylococcal septicæmia. In a recent series LONGACRE, ZAYTZEFF-JERN and MELENEY[8] divided their cases into those treated with phage before and after 1936, when a more potent phage was introduced. In the first group of 15 cases the fatality was 73·3%; in the second group of 21 cases it was 28·5%. They gave frequent and increasing doses intravenously until the patient was getting 50 c.cm. per day, and claimed that phage of high potency, given early and in adequate dosage, offers a good prognosis in this serious infection. KRUEGER and SCRIBNER are doubtful if the benefit reported in septicæmic conditions can be due to a direct lytic action on the organisms in the blood-stream or tissues; yet the experimental work of ASHESHOV, WILSON and TOPLEY[9] showed that antityphoid phage injected intravenously could inhibit infection in mice given a lethal dose of the organism intraperitoneally, though it did not cure an established infection. Other workers have confirmed these experimental results, which demonstrate that phage injected parenterally is not wholly inactivated by the host's tissues. Thus, although phage-therapy is for the time being overshadowed by chemotherapy, it may yet prove a useful weapon.

2. Krueger, A. P. and Scribner, E. J. *Ibid*, 1941, **116**, 2160, 2269.
3. Greenwood, M., Hill, A. B., Topley, W. W. C. and Wilson, J. *Spec. Rep. Ser. med. Res. Coun., Lond.*, 1936, no. 109.
4. Morison, J. *Trans. R. Soc. trop. Med. Hyg.* 1935, **28**, 563.
5. Pasricha, C. L., de Monte, A. J. H. and O'Flynn, E. G. *Indian med. Gaz.* 1936, **71**, 61.
6. Compton, A. *Brit. med. J.* Aug. 23, 1941, p. 280.
7. Guthof, O. *Dtsch. med. Wschr.* April 4, 1941, p. 375.
8. Longacre, A. B., Zaytzeff-Jern, H. and Meleney, F. L. *Surg. Gynec. Obstet.* 1940, **70**, 1.
9. Asheshov, I. N., Wilson, J. and Topley, W. W. C. *Lancet*, 1937, **1**, 319.

GERMAN VITAL STATISTICS.—An official bulletin gives the number of marriages in Germany in 1940 as 715,400 against 944,331 in 1939. The number of live births in 1940 was 1,644,752 and the birth-rate per 1000 inhabitants 20·4. In the territory of the old Reich the birth-rate dropped to 20, the balance being made up by Austria, Sudetenland, Memel and Danzig. It is estimated that as a result of the war 150,000 fewer children were born in 1940. The number of deaths for 1940 was 36,450 more than in 1939. The death-rate increased by 0·4 per thousand to 15. This increase is attributed to the cold spell in 1940. The most important causes of death were cardiac diseases 19·6%, cancer 16%, cerebral apoplexy 10·2%, pneumonia 9%, tuberculosis 6·8%. The increase in deaths from tuberculosis—2000 more than in 1939—is also ascribed to the cold spell. Infantile deaths were roughly 7500 more than in 1939. The death rate per 1000 live births was 65. The net increase in population amounted to roughly 600,000. Some figures for the first quarter of the year 1941 have already been cited (*Lancet*, Aug. 23, p. 235).

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Annotations

TOWN ⟷ COUNTRY

THE evacuation of London school-children is now two years old, and in the balance-sheet presented to the education committee of the London County Council on Nov. 5 the chairman was able to show a reasonable profit-and-loss account. What the children have missed in the way of formal education they have gained in mental and physical vigour and a new breadth of outlook. The constant ebb and flow of children and teachers necessitates the frequent reorganisation of classes, and the scarcity of new entrants makes it difficult to maintain separate departments for juniors, seniors and infants. But if classes have a wider range, they are smaller than in London and there is more scope for individual study. At school the children may find their quarters cramped and the sanitary arrangements inadequate according to London standards, but good food, early bedtime and fresh air have improved their health, and the town children have a better attendance record than the local children and show more resistance to epidemics. If there is a shortage of school books and equipment, nature study and practical geography are attractive new lessons; if the gym, playground and swimming baths are small or non-existent, and if equipment for domestic science, art and crafts is lacking, the children have found new ploys such as milking, bee-keeping, poultry-keeping and, above all, gardening. To many it was news that peas, beans and cabbages have a history that goes beyond the greengrocer in Deptford High Street, but now the boy from Bermondsey brags about his "sprarts" and makes his plot an economic as well as a horticultural success.

No-one can read the report without feeling admiration for the London teachers, who now often look after their young charges in and out of school hours and during the holidays. The closer relationship between teachers and children has been one of the gains of evacuation. The teachers are often leading rather lonely lives, isolated from books, professional contacts and home ties; yet it is due to their enterprise that the children have sometimes been able to contribute to the life of the community, and school concerts and displays of handiwork have been warmly welcomed by the country dwellers. But the country does not seem to have made many lasting converts. When the rest of their family remains in town, it is only natural that the children should return when they leave school, and in an inquiry among 1500 "leavers" less than a quarter remained in the reception area, and of these very few were taking up farming or agricultural work.

THE STICKINESS OF PLATELETS

IT is a classical observation that blood-platelets and white cells collect at the point of injury of a blood-vessel and there form a thrombus; Osler remarked on the way platelets stick to foreign particles. But although methods have been described for estimating the adhesiveness of white cells, no-one has tried to measure this property in platelets. Payling Wright [1] has devised an ingenious method of following the changes in the stickiness of blood-platelets that are caused by the use of various anticoagulants, and incidentally she has suggested an explanation of the disappearance of platelets in stored blood. Specially shaped glass bulbs were used which had carefully ground apertures at either side; these apertures were sealed with coverslips held in place with soft paraffin. Blood was collected in an oiled syringe, mixed with dry anticoagulant in a waxed beaker, and then transferred to the glass bulbs which were steadily rotated by a motor. For control, some of the blood was put into a bulb coated on the inside with soft paraffin. The platelets were counted by a standard method before the blood was put into the bulbs and then at regular intervals afterwards. Finally the coverslips were detached, stained by Leishman's method and examined. It was found that after 80 minutes the platelet count had fallen to between 60 and 20% of the original count; the final figure depended on the anticoagulant used, but still more on the concentration of the anticoagulant. Oxalate, heparin, chlorazol pink, and chlorazol blue were tried. With a concentration that would just prevent clotting, the platelet count after 80 minutes' rotation fell to 20–25% of the initial count with all these anticoagulants; but when concentrations of eight or more times minimal were used the final count in oxalated blood was about 60% of original and about 45% with the other anticoagulants. In the control bulbs there was only a slight fall in the platelet count. When the stained coverslips were examined, the missing platelets were found sticking to the glass, and it was noticed that at the higher anticoagulant concentrations the platelets tended to adhere only to the glass and not to each other. Payling Wright concludes that anticoagulants reduce the stickness of platelets, possibly by reducing fibrin formation on their surfaces. The disappearance of platelets in stored blood is due to their adherence to the walls of the storage bottles and not to disintegration, for had this happened clotting might well have been expected when the anticoagulant concentration was minimal and the fall of the platelet count large; but no clotting occurred. This technique can clearly be extended to pathological problems. Are the blood-platelets less sticky in purpuras? Can "thromb-asthenia" be demonstrated? Will the answers help us to decide between the orthodox school who think that the stickiness of blood-platelets assists the actual plugging of injured blood-vessels and those who hold that they only help to initiate clotting in the shed blood.[2] This method might also be used to seek materials, possibly plastics like Perspex, that platelets will not stick to and could be used for the collection of platelet-containing blood.

1. Payling Wright, H. *J. Path. Bact.* 1941, **53**, 255.

TOO MUCH OF A GOOD THING

NATURE has been none too bountiful with her supplies of the vitamins, as the widespread incidence of deficiency diseases shows. The possibility of overdosage, therefore, hardly arose before the interference of man led to the detection, isolation and finally synthesis of several of their number. After the synthesis of calciferol by the irradiation of ergosterol, the too energetic exhibition of this substance to infants and children led to several instances of undue calcification and occasional death.[3,4] Hypervitaminosis A has not yet been described in humans, although it can be produced experimentally in rats.[5] Overdosage is more readily to be expected with these fat-soluble vitamins, which are not easily eliminated by the body, than with the water-soluble factors, excess of which is readily excreted in the urine. Nevertheless, a large dose of a water-soluble vitamin might cause for a short time a high concentration in the blood and so possibly lead to untoward symptoms. This, for example, is true of nicotinic acid. Doses of more than 50 mg. by mouth or 10 mg. intravenously may produce flushing and irritation of the skin, and occasionally gastrointestinal symptoms.[6] These effects are transitory; the concentration of the vitamin in the blood rapidly falls as the excess, which is not metabolised or stored, is excreted by the kidneys. Whether large doses of the other water-soluble factors produce undesirable reactions is not certain. It has been suggested that intense treatment with vitamin B_1 may give rise to symptoms akin to those of herpes zoster—intense irritation of the skin and a burning pain in peripheral nerve areas.[7]

2. See *Lancet*, May 3, 1941, p. 574.
3. Hess, A. F., Lewis, J. M., and Rivkin, H. *J. Amer. med. Ass.* 1930, **94**, 1885.
4. Harris, L. J. *Lancet*, 1932, **1**, 1031.
5. Takahashi, Nakamiya, Kawakimi and Kitasato, *Sci. Pap. Inst. phys. chem. Res* 1925, **3**, 81.
6. E.g., Spies, T. D., Bean, W. B. and Stone, R. E. *J. Amer. med. A* 1938, **111**, 584.
7. Steinberg, C. L. *Amer. J. digest. Dis.* 1938, **5**, 680.

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In all these instances excessive intake produces—or is said to produce—changes which are related to the known action of the factor concerned as indicated by the effects seen in deficiency. This was first shown with hypervitaminosis D, which gave rise to an increase in the blood level of phosphate and calcium with consequent calcification.[4] Excess of nicotinic acid affects the skin and occasionally the gastrointestinal tract, and excess of vitamin B_1 is reported to affect the nerves. A novel aspect of hypervitaminosis, however, has recently been studied by Loewenthal of Basle.[8] He suggests that large amounts of ascorbic acid, which are excreted by the kidney, might produce changes in the urine conducive to the formation of urinary calculi. Loewenthal ingested 1 or 2 g. of the vitamin daily for five weeks and carried out several types of investigation—some rather unusual—on the urine before and during this period. The effect of the vitamin was to produce an increase in the titratable acidity of the urine, an increase in the turbidity and a change in the gold-sol reaction (a test usually applied to the C.S.F.). He does not profess to be able to explain the exact nature of these last two changes but interprets them simply as indicating an alteration in the "protective colloids" of the urine. This, together with the increased acidity, are assumed to imply a greater tendency to the formation of urinary calculi. These tentative conclusions will require a great deal of confirmation and elaboration. But even if true, they will certainly not deter us from the appropriate and adequate treatment of suspected deficiency of vitamin C. The daily requirements of the vitamin are probably about 50 mg. and even a case of severe scurvy will be cured by the administration of 1 g. daily for a week or two. Doses such as those taken by Loewenthal are thus rarely if ever required. Moreover, the fact that unnecessarily large overdoses of vitamin D produce toxic symptoms has not interfered with the cure or prevention of rickets by the intelligent use of this substance.

The danger of hypervitaminosis in ordinary conditions of therapy or prophylaxis is often exaggerated, but its existence may at least serve the useful purpose of directing attention to the quantitative aspect of vitamin dosage. There is a tendency to order a convenient preparation without thinking of the amount of the vitamin really desired. The possibility of overdosage, and incidentally a great deal of waste of precious nutritional material, will be avoided when vitamins are prescribed in units or milligrammes or in human "daily shares" and not as so many capsules or tablets.

MANIFESTATIONS OF ENDEMIC FLUOROSIS

SURVEYS in America[9] and in England[10] have shown that in children the mottled enamel of mild endemic fluorosis is associated with a greater than average resistance to dental caries, and that the toxic action of fluorine tends to affect those whose general nutrition is poor. In other parts of the body fluorine may exert an indirect action. Young and his colleagues[11] pointed out that in the ætiology of endemic goitre the absolute iodine content of the water and soil is not the only factor and that something else determines the availability of the iodine to meet human and animal needs. In at least one area of this country, among people living under conditions of low iodine intake Wilson[10] has established a relationship between the distribution of goitre, of fluorine in rock and of mottled enamel. In the locomotor system fluorosis especially attacks tissues rich in calcium. Roholm[12] described the pathological calcification of tendons, ligaments and fasciæ, and the formation of osteophytes among cryolite workers absorbing large amounts of fluorine. In endemic human fluorosis bone changes were first detected by Shortt and others[13] among communities in South India, and subsequently Pundit and his colleagues,[14] by comparative dietary surveys among these same people, showed that the incidence of bone deformity bore a definite relation to the economic and nutritional state of the communities concerned, indicating again that the toxicity of fluorine is made more evident by a "poor" diet. Recently Ockerse[15] in South Africa has described bone changes among villagers in the Pretoria district using borehole water containing over 11 parts per million of fluorine. Clinical symptoms include stiffness of the spine in the lumbar, thoracic and cervical regions, and pain and stiffness around the joints of the arms and legs and lumbar regions. The radiograms of an advanced case show ossification with increasing density of bone and calcification of the lumbar and thoracic vertebræ and attachments; osteophytic outgrowths and periosteal deposits are also present along the radius and ulna and around the elbow-joint and margins of the ribs. The clinical picture is similar to that of the most severe cases in South India. Fluorine, then, has a claim to be one of the trace elements necessary for nutrition, but its intake must be carefully limited and balanced with adequate iodine and the other factors influencing ossification. Unfortunately we have a long way to go before we can decide what the optimum intake of fluorine is and can ensure that everyone gets it.

STETHOSCOPES OLD AND NEW

SINCE that day in 1816 when Laennec took a quire of paper, rolled it up to form a tube and applied it to the chest of a corpulent young woman, the art of auscultation has been developed to a fine degree. Although "immediate" auscultation seems to have been practised by Hippocrates and Harvey, medical men were slow to appreciate the significance of the heart sounds. Indeed Parisanus (1663), a physician of Venice, rejected Harvey's observations with the words "Nor we, poor deafs, nor any other doctor in Venice can hear them, but happy is he who can hear them in London." The great Corvisart, nearly two hundred years later, referring to the heart sounds, wrote "I have never had an opportunity, I repeat it, of ascertaining the unquestionably rare observations; I have barely heard these strokes by applying my ear close to the patient's chest." Both statements, in their obtuseness, recall Sir James Mackenzie's words on another aspect of cardiac examination. "Indeed I am doubtful," he wrote in 1920, "if an X-ray examination of the heart has ever thrown the slightest light on any cardiac condition." From the roll of paper to the perforated wooden cylinder was Laennec's next step, while Piorry's modifications and his addition of ear piece and chest piece in 1828 resulted in what is essentially the monaural stethoscope of recent times. Williams probably described the first binaural model about 1843 while Cammann replaced the lead tubes by flexible ones in 1855. Thus, briefly, was evolved the modern binaural stethoscope.

The chest piece in all these models was funnel or trumpet shaped. In the phonendoscope, invented by Bianchi in 1894, a diaphragm chest piece with a rigid membrane was first used. The combined bell and diaphragm chest piece of the latest models seem satisfactorily to cover the acoustic ranges necessary for clinical examination of the heart and lungs. In a recent study of the laws governing auscultation Rappaport and Sprague[16] of Boston point out that the bell chest piece when applied to the patient's chest functions in reality as a diaphragm chest piece. The skin enclosed by the lip of the bell acts as a diaphragm, while the subcutaneous

8. Loewenthal, M. *Schweiz. med. Wschr.* 1941, **71**, 761.
9. Dean, H. T., Jay, P., Arnold, F. A. Jun. and Elvove, E. *Publ. Hlth Rep. Wash.* 1941, **56**, 761.
10. Wilson, D. C. *Lancet*, 1941, **1**, 211, 375.
11. *Spec. Rep Ser. med. Res. Coun. Lond.* No. 217, 1936.
12. Roholm, K. Fluorine Intoxication, London, 1937.
13. Shortt, H. E., McRobert, G. R., Barnard, T. W. and Nayar, A. S. M. *Ind. J. med. Res.* 1937, **25**, 553.
14. Pundit, C. G., Raghavachari, T. N. S., Subba Rao, D. and Krishnamurti, V. *Ibid*, 1940, **28**, 559.
15. Ockerse, T. *S. Afr. med. J.* 1941, **15**, 261.
16. Rappaport, M. B. and Sprague, H. B. *Amer. Heart J.* 1941, **21**, 257.

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tissue becomes a damping medium. The larger the diameter of the bell chest piece the better its response to low-pitched sounds. This is accomplished at the expense of high-frequency components. By increasing the pressure of the bell chest piece on the patient's chest one is able to increase the natural period of the skin diaphragm and thereby attentuate the lower-pitched components. Higher-pitched sounds are then accentuated as a result of the decreased masking effect. Thus loud first and second sounds, and a loud systolic murmur of fairly low pitch are damped down, while a high-pitched diastolic murmur will stand out better. When the pressure on the chest piece is reduced, low-pitched murmurs, third heart sounds and gallop rhythms may be elicited more readily. The diaphragm type of chest piece is especially useful in detecting faint, high-pitched sounds, such as the diastolic murmur of aortic incompetence and the "bronchial" respiratory sounds. If the diaphragm is too thick, however, there is a general reduction of sound intensity. Rappaport and Sprague found that the optimum diameter of the bell chest piece is 1 in. and that of a bakelite diaphragm 1½ in.; the thickness of the latter should be about 0·015 in. The smaller the diameter of the bell the higher the pitch of the sounds. They think that the bell should not be considered primarily as an accumulator but rather as a microphone or telephone receiver. Finally, as many students may have suspected when they began clinical work, they find the length and calibre of the rubber tubing important. They show that the pressure variations at the ear, produced by the motion of the skin or bakelite diaphragm, are inversely proportional to the internal volume of the stethoscope. It follows, therefore, that the tubing should be as short as possible and the calibre as small as possible. The wall of the tubing should be sufficiently rigid to prevent any wall motion, for that would reduce the effective pressure variations transmitted to the observer's ear. Here they differ from Johnston and Kline,[17] but the latter reached their conclusions as a result of experiments on the human cadaver with a mechanical ear.

SWEAT-GLANDS IN THE DOG

ANOTHER illusion has been shattered, though not apparently for the first time. Speed,[18] of Edinburgh, who has taken the trouble to fix pieces of dog skin in formol and make microscopic sections, has found sweat-glands in them. He makes no claim to a special technique; he has simply followed the biblical injunction to seek. From his fairly comprehensive summary of previous literature it appears that others have done the same and have not always been rewarded. Nevertheless, eight investigators are quoted who have described the glands at various times during the last 75 years. They differ in their estimates of incidence and distribution and in the way the glands communicate with the surface. Speed says that in the hairy parts the glands open into dilatations of the hair follicles between the opening of the sebaceous glands and the skin surface. They are numerous on the skin of the lips, head, back, thorax, shoulders and thighs, but few over the abdomen and groin. They are absent on the hairless skin of the muzzle, on the scrotum and on the perinæum. The sweat-glands of the pads of the feet are easily seen because of the absence of the hair follicles, and, unlike the others, are coiled. Thus perishes the fallacy that the dog pants because he cannot sweat over the general surface of his body. Nevertheless, he does pant, and no microtome can strip him of this well-known singularity. Perhaps he keeps a large part of his "evaporation reserve" in the surface of his tongue and upper respiratory tract, in which case his equipment for making use of the latent heat of evaporation of water seems to be more varied than that of man. No doubt other investigators will pursue the matter further to see whether this advantage is shared by breeds other than the half-dozen tested by Speed. It would be interesting to know how effective the sweating is. The fact that no visible moisture appears argues efficient vaporisation. The probability that a relatively stagnant atmosphere saturated with water vapour is enmeshed in the hairs suggests the reverse.

17. Johnston, F. D. and Kline, E. C. *Arch. intern. Med.* 1940, **65**, 328; see *Lancet*, 1940, **1**, 557.
18. Speed, J. G. *Vet. J.* 1941, **97**, 252.

REPAIR OF THE PERINÆUM UNDER LOCAL ANÆSTHESIA

ATTENTION was drawn last week (p. 569) to the use of local anæsthesia in normal pelvic delivery, and in minor obstetric procedures such as episiotomy and the application of low forceps. Local anæsthesia should also have a place in domiciliary midwifery in the suture of perinæal lacerations. Williams[1] points out, very rightly, that all perinæal tears, however trifling, should be sutured immediately after delivery. In the patient's home this means that a second doctor has to be summoned to give an anæsthetic; otherwise the tear is neglected or inadequately united, either without anæsthesia or under anæsthesia administered by the accoucheur himself—a procedure which leads to carelessness in asepsis and lack of proper supervision of the anæsthetic. Local anæsthesia overcomes these difficulties and the technique is simple. No special instruments are necessary and the only requisite is some form of support to control the patient in the lithotomy position. The left lateral position is unsuitable in that it tends to approximate the torn edges of the wound and so mask the extent and complexity of the area of operation. To ensure an optimum position, the patient's coöperation must be obtained and the nervous patient is unsuitable for this type of anæsthesia. An ordinary 10 c.cm. record syringe is used with fine hypodermic and long serum needles. The solution Williams recommends is 1% procaine, without the addition of adrenaline. The skin edges of the tear, deeper structures and muscles are infiltrated generously, but not so as to balloon them unnecessarily. No. 2 non-chromicised or chromicised catgut and a sharp curved cutting needle are recommended: a needle holder is a useful accessory, but not essential. The area of operation is properly isolated with towels and gently swabbed over with an antiseptic solution such as Dettol. The tear is carefully explored to ascertain its extent, but no matter how severe it may be it will be suitable for suture under local anæsthesia. It must not be forgotten that a small skin tear may indicate serious deep vaginal lacerations running high up towards the vaginal vault, hence the importance of a preliminary survey before starting suturing. For inspection a portable headlamp allows the operator to move about freely and does away with the need for an assistant to illuminate the site of operation. When the repair is complete a finger is inserted into the rectum to assess the power of the anal sphincter and the anatomy of the perinæal body; this will also exclude the unlikely possibility of a suture having transfixed the mucous membrane of the rectum. Should this last disaster be found the whole wound must be taken down and resutured, as such a stitch may actually lead to infection and might predispose to a subsequent fistula. Neal Smith[2] has reported on the successful suture of 17 unselected cases of perinæal laceration, ranging from a small first-degree to a serious perinæal tear. Some were hospital and some district cases and all healed by first intention without any complication. The technique used was exactly similar to that of Williams, except that 2% procaine was used instead of 1%. It is probably always an advantage to use more of a weak solution in local infiltration anæsthesia than less of a strong solution, the ideal

1. Williams, B. *Post-grad. med. J.* July, 1941, p. 117.
2. Smith, D. J. N. *J. Obstet. Gynæc.* 1941, **48**, 610.

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being ½ or 1% procaine. Smith like Williams urges the importance of early operation and notes that expedition enhances the efficacy of the anæsthesia. The advantages of local anæsthesia for suture of perineal tears have long been recognised by a few obstetricians, but for some reasons any operation performed under a local or regional anæsthetic tends to be unpopular in this country both in the minds of the lay and the professional concerned. This is an unfortunate attitude that should if possible be overcome. Inhalation anæsthesia in the mother at or after delivery is always fraught with some small risk and this especially in cases complicated by cardiac, pulmonary or other intercurrent diseases, notably toxæmia. In these cases it is much to be recommended that the small extra trouble of using a local anæsthesia be cheerfully undertaken by the operator, who after all is more concerned with the patient's safety than his own time and convenience.

SIR ARTHUR HILL, F.R.S.

THE tragic death from a riding accident on Nov. 3 of Sir Arthur Hill has removed at the age of 66 years one who was still full of vigour and the zest of life. He had been director of the Royal Botanic Gardens at Kew for the past nineteen years where he had succeeded Sir David Prain. He had a keen artistic appreciation of the beauties of the gardens which he did much to preserve and enhance. During his directorship the extensive addition to the herbarium was erected and the north gallery was restored to its original condition. Hill's scientific interests centred chiefly in plant morphology and he took an especial interest in modes of germination and specialised types of seedling structure. His contributions to systematic botany included publications of the taxonomy of various genera of which the extensive and medicinally important genus strychnos was one. He also edited the supplements to the "Index Kewensis," the *Kew Bulletin*, the *Botanical Magazine* and the "Icones Plantarum." Hill had travelled widely both in connexion with his work and for pleasure and he was a genial and sympathetic companion. He was endued with a strong sense of esprit de corps and cherished a deep affection for Marlborough and King's College, Cambridge, where he was educated, while he regularly attended meetings of such bodies as the Royal Society Dining Club of which he was a member. He will be remembered by many for his kindly acts—he was of those who delighted to do good by stealth.

DARK LANTERN ON RHEUMATISM

THE typical picture of rheumatic fever is sufficiently distinct from that of rheumatoid arthritis for there to be little confusion, but every clinician can remember cases where only the passage of time and the development of the characteristic sequelæ enabled him to make a certain diagnosis. In the age-groups where they overlap the two diseases come to resemble each other more closely; the disease process, too, is of similar type, and thus the nature of the relationship between the two has always excited speculation and conjecture. There are three main theories: first, the characteristically English view that the diseases are ætiologically distinct and that the occasional occurrence of destructive joint changes and heart damage in the same patient is merely coincidental; secondly, as authorities in New York [1] maintain, that the two diseases are ætiologically related and may be manifestations of the same agent in differently reacting types; thirdly, a German view, that there are two types of rheumatoid arthritis, one primary and the other secondary to rheumatic fever. A recent study from the Mayo Clinic might be expected to throw new light on this problem. Autopsies were made on 25 cases of chronic infectious arthritis whose clinical records had been adequately reviewed by a member of the arthritis unit under the able leadership of Dr. Phil Hench.[2] The disease had been present for an average of 7 years, the periods ranging from 3½ months to 30 years. The new light has, however, as so often happens, merely shown up several dark corners. Of these 25 hearts, 14 (56%) showed lesions indistinguishable from those of rheumatic fever; a result on which Hench wisely refuses to comment except in a non-committal way. He believes that these cases represent the presence of two coincidental diseases; but it is a curious distribution since only about 5% of routine post-mortem studies at that centre show evidence of rheumatic fever. As Hench says, additional observations, both clinical and pathological, must be made on many other cases before final appraisal can be attempted. Too often the problems of chronic disease are shelved, like the sufferers themselves, as "lacking clinical interest."

1. Baggenstoss, A. M. and Rosenberg, E. E. 1941, *Arch. intern. Med.* **67**, 241.

INSULIN IN THE TREATMENT OF G.P.I.

A. M. San Martin describes what he claims to be a new treatment for general paralysis of the insane by means of insulin in addition to antisyphilitics.[3] A woman was referred to him in whom antisyphilitic treatment and malaria had failed to bring about any improvement. It was decided to try pyretic treatment by means of vaccine, but first, because the patient was in wretched general condition, to give her a high-carbohydrate diet and insulin to improve her nutrition. After she had been treated in this way for a few days it was observed that not only her physical but her mental state also was improved. The treatment was continued and in addition acetarsol was given; in three months' time the patient was able to leave hospital apparently cured. Encouraged by this unexpected success, San Martin has tried a similar method in 9 more cases, combining insulin with bismuth or an arsphenamine preparation. All were patients in whom malarial therapy had failed. In 7 there was striking improvement, 4 being clinically cured; the remaining 2 patients died. In the first case small doses of insulin were given with care to avoid hypoglycæmia; in the remaining 9 hypoglycæmiac doses were given, as for schizophrenia, daily for about 10 days. Antisyphilitics were then begun, and the insulin continued except on the days when the patient received an injection of bismuth or arsphenamine. It is not stated how long treatment went on. Other workers have been using leptazol convulsions or electric-shock therapy in G.P.I.[4] In these convulsive therapy was adopted because mental improvement had not resulted from the usual forms of antisyphilitic treatment. A distinction must therefore be made between treatment aimed at eliminating syphilitic infection (and thus preventing further progress of the disease) and treatment aimed at ameliorating the symptoms which persist after the infection has been eliminated. It has long been recognised that schizophrenic and other psychotic syndromes sometimes occur in the course of G.P.I. Some of these may be merely associated psychoses; others have probably been produced by the syphilitic lesions themselves. The mental improvement obtained in some schizophrenic patients by prefrontal leucotomy suggests that the frontal lobes may play an important part in the symptomatology of schizophrenia. Since the lesions produced by neurosyphilis often affect the frontal lobes, it is possible that schizophrenic changes may be induced by these lesions. Thus, once the syphilitic infection has been arrested, forms of therapy which have been successful in schizophrenia might be expected to succeed in these organically produced schizophrenics. But it must not therefore be assumed that any such new forms of treatment can be a substitute for antisyphilitic remedies.

2. Hench, P. S. 1941, *Proc. Mayo Clin.* **16**, 237.
3. *Rev. méd. Chile*, 1941, **69**, 380.
4. E.g. Kenyon, V. B. and Rapaport, D. *J. ment. nerv. Dis.* August, 1941, p. 147.

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Special Articles

THOUGHTS ON A STATE MEDICAL SERVICE

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MEDICAL planning for the postwar era cannot avoid grave mistakes if the broad conditions of life likely to obtain then are not faced at the outset. Two main assumptions are made here which while sweeping in character may not in the time to come be so far fetched as they now appear.

First, it can be safely assumed that the more even distribution of the national wealth which is rapidly taking place will after the war eliminate the richest classes in the community. To have a net income to spend of £10,000 a year under the present taxation means the possession of a gross income approaching the quarter of a million. For a long time to come taxation is not likely to be reduced and to maintain the purchasing value of the saving certificates and war bonds now accumulating will need hard work and hard living for all. There will be too little money available for much to reach voluntary organisations, and the income from charitable sources which has in the past supported the great voluntary hospitals may be reduced to vanishing point. There will also be much less money for the non-panel general practitioners and still less for the consultant. These will no doubt remember the lean years from 1930.

Next, there seems every chance that the income of the wage-earner will depend not only on the trade-union or other rate of pay applicable to his job but also on some system of family allowances. At present only the wage-earner is entitled to the benefits of national health insurance but the net is ever being cast wider and the logical outcome is for the entire family of the wage-earner to be covered by insurance. If the head of the family receives allowances from the state it is no more than common sense that the state should make sure that the family gets the benefit, and how better than by compulsory health insurance?

With these two assumptions in mind the outlook of the medical service serving the postwar community will have to be far different from what it was in pre-war days. Willy nilly we must expect the voluntary hospital as well as other voluntary health organisations to disappear, or at any rate to undergo a revolutionary change from their present position, and must also expect the bulk of the patients who now attend the voluntary hospital or call in the general practitioner to be covered by compulsory health insurance. The future is likely therefore to hold in store a state medical service which will embrace a great majority of the community if not almost the whole of it.

A REAL FAMILY DOCTOR

Bearing in mind—what is sometimes overlooked—that the medical service is for the benefit of the citizen and not for the benefit of the medical profession, is it too optimistic to think of the future insurance practitioner being in charge of say not more than 1000 families instead of not more than 3000 individuals? Instead of the wage-earner going to his "insurance doctor," his wife calling in some other medical man, and his children seeing a welfare-clinic doctor, the school doctor or a doctor at the local voluntary hospital, the entire family as one unit may well be under the care of one medical man. It would admittedly be a big job for that man, but behind him in this imagined state service there would be consultants from the state hospitals with all ancillary services. The state hospital for the district would be surrounded by the satellite special institutions for infectious disease, tuberculosis, maternity and mental cases, and among them would be the "aftercare" and convalescent home, where a period of real convalescence free from all fear of want for the dependent family would put the wage-earner firmly on his feet before he was discharged to face again the struggle of life.

This "family doctor" would be a real one, not one in name only, and he would have to assist him an almoner, a health visitor and a public-assistance officer, working as a team to decide the help needed by all or any members of a family to regain and maintain health. A consulting-room for each family doctor would be provided in the local health centre, where special clinics would be installed such as dentist, oculist, chiropodist, antenatal, tuberculosis and so on. The qualifying curriculum of the medical student would need drastic revision, with far greater training in the maintenance of health and a corresponding reduction in the vast amount of scientific and clinical information which he is now asked to memorise largely for examination purposes. There must of course be compulsory postgraduate training for all, with facilities for research work and training in particular subjects for the future consultants and specialists.

ORGANISATION

The state medical service must be decentralised to the highest possible degree, to ensure that its life is not crushed out by the administration. One can picture a ministry of health of moderate dimensions to implement the policy of the state and exercise a general but not a detailed control over a number of regions. These regions in turn would supervise the individual districts and coördinate the activities of each with others within the region. Some of the special hospitals, for example, might well serve more than one district. Holiday camps and convalescent or aftercare homes also seem to fit into the province of the regional staff. The districts should be as far as possible autonomous within their broad boundaries. Their size must be governed by considerations of geography as well as population, but they would be of an extent compatible with efficiency and economy, each including not more say than 250,000 people or an area greater than a hundred square miles, but depending more on travel-time than distance. The pay and service conditions of the medical staff would be graduated with increments for years of service and higher pay for the more responsible positions, promotion to which would be gained by combined examination and reports of superiors. Pensions, allowances and so on might be based on the conditions of medical service in the Forces. Russia has evolved a national medical service and no doubt we could learn from her experience and profit from her mistakes.

The position of the local authorities in such a national service would require careful consideration, but if districts were of the size suggested the present local authorities would be superseded. The maternity and child-welfare and school medical services would disappear, together with much of the activity of public assistance, district nursing and voluntary organisations such as the C.O.S., I.C.A.A., C.C.H.F., and many others. The out-patient departments of hospitals would be almost entirely emptied, and, with the increasing supervision of the family by the "family doctor" and the support given by convalescent homes and aftercare, many chronic cases would be prevented and the number of hospital beds for all but acute cases might in time be greatly reduced. In fact the success of the family doctors in a district could be readily gauged from the number of hospital beds which had to be maintained. The opportunities for research would be immensely enlarged, and if doctors could be persuaded to keep a careful history of each member of every insured family light would be thrown on the earliest stage of disease of all kinds.

* * *

A state medical service such as here outlined would unify many efforts at present overlapping and conflicting, but could the many interests concerned be persuaded that it would be for the benefit of the community?

COST OF LIVING IN GERMANY.—According to the official index for the cost of living in Germany (*Dtsch. med. Wschr.* Sept. 26, 1941, p. 1074) during July the prices of goods in daily demand were 1·5% higher than in June. This increase is attributed to seasonal influences. The figure for the total cost of living in July was 136·1 (taking the cost in 1913–14 as 100) as against 134·1 for June. The figure for food rose from 130·6 in June to 134·2 in July—an increase of 2·8%. This was ascribed to the more general use of new potatoes which were of course dearer than the old ones. The price of other fresh vegetables also increased. The cost of clothing rose from 158·1 in June to 158·7 in July—an increase of 0·4%.

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PORTS OF ENTRY IN POLIOMYELITIS

THE opening of the poliomyelitis season is a reminder that recent experimental work, particularly in the United States, has helped to narrow down the problems relating to the transit of the virus to the central nervous system. Fairbrother and Hurst, in 1929, demonstrated that the virus of poliomyelitis spreads along the axis-cylinders, involving different tracts in the brain serially, and their important work has since been expanded and modified. In their monkeys the nervous system was infected by way of the olfactory tract after intranasal inoculation; from this the idea has taken root in many quarters that infection in man adopts the same path. Bodian and Howe,[1] among others, have confirmed that the axis-cylinders are the lines of communication of the virus, but they have made it clear that ports of entry other than the nasal mucosa should be considered. Some of their evidence has been derived from the study of arrested and non-paralytic examples in experimentally infected animals. Cases of these sorts unquestionably occur in man but their pathological anatomy naturally evades investigation. Bodian and Howe describe changes in 2 chimpanzees and 3 rhesus monkeys which, after administration of the virus, showed spontaneous arrest of the infection with a corresponding limitation of inflammation to foci within the central nervous system. Their first chimpanzee, after being inoculated in the mouth with a virus suspension, developed, a month later, a febrile reaction lasting 24 hours. This was accompanied by a pleocytosis in the lumbar spinal fluid and was followed a day later by a mild and transient left facial paralysis. When the chimpanzee was killed four days after this, the inflammatory reaction was found to be limited to the gasserian ganglia and to foci in the medulla oblongata and cervical cord including the trigeminal centres and left facial nucleus. Thus the disease had apparently been arrested before the characteristic distribution of the inflammatory changes was complete. The second chimpanzee received an intranasal inoculation of the virus and died about a week later of pulmonary tuberculosis, without displaying any clinical signs of poliomyelitis; but microscopic changes characteristic of poliomyelitis were present in the brain, restricted to the olfactory bulbs and secondary olfactory centres.

The site of the lesions within the nervous system in these 2 chimpanzees thus bore a significant relation to the site of the inoculation and this was again shown in the 3 rhesus monkeys which were inoculated intranasally and, after a febrile response, developed no paralyses. Histological examination at periods from one to three weeks later showed restriction of the lesions to the olfactory bulbs, secondary olfactory centres and hypothalamus. In all probability similar localised but arrested inflammations occur in man. Howe and Bodian have investigated the relations between the sites of inoculation and associated changes in the central nervous system in a further group of 6 chimpanzees.[2] In this group, 2 were inoculated by the olfactory, 2 by the oral and 2 by the gastro-intestinal route. One member of each of the last two pairs had the olfactory tracts divided by a preliminary intracranial operation. The resulting attacks of poliomyelitis were milder than those produced by a similar dosage in rhesus monkeys and resembled clinical examples commonly seen in man. All the animals were killed in the acute stage of the disease. Histological examination showed a distribution and intensity of encephalomyelitis which were evidently related to the port of entry of the virus: thus lesions in the olfactory tract were present only in the animals receiving intranasal inoculations while those inoculated in the mouth showed a heavy involvement of the bulbar region, the fifth and possibly the ninth nerves being especially implicated in one animal. In the animals infected by way of the stomach there was histological evidence that the virus had reached the spinal cord first and the brain later. A further point of interest in these experiments was that the virus could be demonstrated in the stools with nearly as much regularity as it can in man. In this the chimpanzee differs from the rhesus monkey which is not susceptible to infection by gastro-intestinal inoculation, and this helps to support the opinion that, where the course of the disease is concerned, zoological affinity carries some weight.

APPLICATION TO MAN

Howe and Bodian have analysed the lesions in 13 human brains obtained from rapidly fatal cases or cases dying in late stages of the acute illness.[3] They found, like earlier observers, that lesions in the olfactory bulbs and secondary olfactory centres were rare, and that the evidence, taken as a whole, pointed to ingress of the virus by the mouth, pharynx or intestinal tract. The relatively late stage of the disease in these cases unfortunately made it impossible to establish the port of entry more narrowly than this; but in cases showing an initial bulbar paralysis it may be supposed that the oro-pharyngeal mucosa was the site. Sabin[4] mentions, in a recent symposium on poliomyelitis, that during the last ten years a relatively large number of cases of bulbar poliomyelitis have been reported as occurring shortly after tonsillectomy or adenoidectomy performed when poliomyelitis was prevalent. The evidence for the gastro-intestinal tract as a portal lacks precision but it does seem likely, from the anatomical findings in man, that the virus travels from the gut to the spinal cord by way of the sympathetic nerves and by way of the vagus nerve to the medulla oblongata. Sabin and Ward, in mapping out the distribution of poliomyelitis virus in human tissues, have found that it is mainly confined to the nervous system and the alimentary tract, but is not distributed indiscriminately in either; in the nervous system it is found in areas that have undergone pathological alteration, while in the alimentary tract it predominates in the pharynx and ileum. In the absence of any evidence of centrifugal spread of the virus from the central nervous system to peripheral parts, Sabin considers that the intestinal tract is the probable port of entry and that in general the olfactory, respiratory and cutaneous routes can be disregarded. A case of poliomyelitis in a laboratory worker who had been handling the virus, reported elsewhere by Sabin and Ward,[5] is of interest in this connexion. The victim had been washing and grinding tissues from infected cynomolgus monkeys, and the attack—which was accompanied by paralysis first of the right leg and later of other limbs—was fully proved to be poliomyelitis.

Much has still to be learnt of the methods by which virus can travel in the sympathetic system and peripheral nerves. That it does travel in the sympathetic chains appears from the finding by several workers, and confirmed by Howe and Bodian,[6] that transection of the spinal cord will not prevent the progress of virus beyond the level of division. But the virus still spreads in animals sympathectomised at the level of transection, apparently via sympathetic fibres to the gut and thence by the vagus nerve to the brain stem. The same workers estimate[7] the rate of travel of virus along the axon to be 2·4 mm. per hour, a figure which may be compared with the rate of 4–5 cm. in four hours ascribed to methylene-blue by Perdrau in 1937.

1. Bodian, D. and Howe, H. A. *Bull. Johns Hopk. Hosp.* 1941 **69**, 135.
2. *Ibid*, p. 149.
3. *Ibid*, p. 183.
4. Sabin, A. B. *J. Amer. med. Ass.* 1941, **117**, 267.
5. Sabin and Ward, R. *Science*, 1941, **94**, 113.
6. *Bull. Johns Hopk. Hosp.* 1941, **69**, 86.
7. *Ibid*, p. 79.

SUPPLEMENT ON ECONOMY IN DRUGS

THE therapeutic requirements committee of the Medical Research Council have added a supplement to War Memo. No. 3 (Economy in the Use of Drugs in War-time), in which additions are made to the classified lists and the categories of certain drugs (indicated by an asterisk in the following list) are changed. The additions are mostly drugs to which approved names have been allotted since the publication of the memo, but some herbal remedies have been added to category C. The substitutes or equivalents suggested are given in parentheses.

(A) *Drugs which are either regarded as essential or readily available.*—Amethocaine, diphenan, coconut oil, hexazole, menaphthone (synthetic vitamin K, 2-methyl-1 : 4-naphthoquinone), mesulphen, orthocaine, soluble phenytoin (sodium diphenylhydantoinate), pholedrine, Pirevan, Piroparv, pyrethrum, safrole, and a large number of sera and vaccines.

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(B) *Drugs in the use of which strict economy should be observed.*—Acetylsalicylic acid,* amethocaine, cochinèal, diphenan, gonadotrophic hormone from pregnant mare's serum or pregnancy urine, hamamelis,* lobelia,* phenol * (chlorocresol, chloroxylenol), phosphoric acid,* progesterone, sodium acid phosphate,* phosphate * and salicylate,* sulphacetamide, sulphadiazine, sulphaguanidine and sulphathiazole.*

(C) *Drugs which are not essential and do not justify importation or manufacture in war-time.*—Celery seed, cummin, euphorbia, galangal, grindelia, hypophosphoric acid and its salts, kola nuts, leptandra, *Mandragora autumnalis*, pennyroyal, raspberry leaves, Rubiazol (sulphanilamide), sarsaparilla, sassafras, serpentary, skullcap, slippery elm bark, liquid and dry liver extract, virginian prune.

Substitutes or equivalents are also suggested for the following unclassified drugs.

Acaprin (Pirevan, Piroparv), Albucid (sulphacetamide), Cignolin (dithranol), Decicain (amethocaine), Mitigal (mesulphen), Orthoform (orthocaine).

The committee remind prescribers that liver extracts are now controlled under a defence regulation which states that they shall be given only to persons suffering from pernicious or other megalocytic anæmia and shall be given by injection only, hog's stomach being used when a remedy for oral administration is required. They again enjoin strict economy in phenol and its derivatives, including the salicylates and aspirin, and say that there is a serious shortage of liquid paraffin which is not likely to be relieved under present conditions. The use of glycerin in medicine is now limited to the manufacture of B.P. and B.P.C. preparations and to the dispensing of doctors' prescriptions. Of the sulphonamides in common use the committee point out that sulphanilamide is the most economical, and urge that sulphadiazine, sulphaguanidine, sulphapyridine and sulphathiazole should be prescribed only when there are special indications.

SOCIAL SECURITY IN NEW ZEALAND

CONTINUING his story (*Lancet*, July 12, p. 51) a correspondent writes: The N.Z. Government had already made one attempt to introduce a universal general practitioner service. In February Hon. A. H. Nordmeyer announced a "panel" system, capitation fee 15*s.* per head (man, woman and child). This was taken up by a few doctors only, chiefly in one-doctor areas, where it has been accepted by all, and works well. As a complete solution for the whole country it failed. A general election being due in November, the tax for Social Security having been collected for 18 months, and the promise of the main benefit (G.P. service) being still unfulfilled, the Minister, at the end of August, proposed a fee-for-service plan. The B.M.A. had not publicly altered its official plan, but it was known that a section, chiefly G.P.s, was willing to consider such a plan. The doctors, however, still considered it a bad time to make any major change, with 25–30% of their number abroad or engaged full time in military duties at home. The N.H.I. committee of the B.M.A. met the Ministers towards the end of August, and subsequently, but as the nature of the new proposals became apparent hostility rapidly developed. The first version was that from a "bottomless pit" a fee of 5*s.* would be paid to the doctor per attendance at his rooms, 6*s.* 6*d.* in the case of a visit to the patient's house, and extras for mileage, &c. It was to be illegal for a doctor to collect fees in any other way. A public outcry was raised, doctors, clergy, chambers of commerce, &c., joining in, and meetings were held all over the country. The Government gave in to the extent of raising the fee from 5*s.* to 7*s.* 6*d.*, with extras for night calls, and also in leaving it open for patients to enter into any private arrangements they like with doctors. In this form the proposal became law in September as an amendment to the Social Security Act, the inauguration of the service being postponed from Oct. 1 to Nov. 1. The B.M.A. has announced publicly that practice will go on as usual from Nov. 1. It has also suggested an investigation by a non-political commission. At the time of writing (Oct. 14) the position is thoroughly unsatisfactory. Proposals arising out of party-political interests, bearing no traces of expert medical guidance, and containing no evidence of concern for medical standards or modern requirements, are met by an overworked profession with sullen resistance. Whether the scheme will succeed, in whole or in part, remains to be seen. Whether the profession will be able to come forward with some workable proposals along modern lines also remains to be seen. But Time Marches On. The people are impatient.

SCOTLAND

THE CAMPAIGN AGAINST DIPHTHERIA

THE central health authority has reviewed recent diphtheria experience and is pressing forward with immunisation. Officers of the Department of Health told a recent press conference that 600,000 of Scotland's child population of 1,120,000 had already been immunised and that the aim was to secure as a minimum the immunisation of 85% of the child population—a "target figure" which they believed would largely remove the danger of an epidemic occurring even under the most difficult war conditions. There is little doubt that the immunisation of such a proportion of the child population would secure the desired result, assuming that the under-fives are adequately protected. In the period 1861–65 the mortality-rate from diphtheria in Scotland per 100,000 of the population was 85. Since then the rate has shown a steady and striking fall. In 1931 it was 7, representing in all 356 deaths, with a total number of notifications 8915. From 1931 the number of deaths from diphtheria has shown little tendency to further reduction. Dr. Davidson told the press conference that an average of 400 children died from the disease annually in Scotland in what is called a normal year, that last year the figure was 675, and that in the first half of this year there were 304 deaths. During the last decade the type of infection in Scotland has undergone change. Ten years ago *gravis* infection was rare and it continued to be rare for some years after it had become not uncommon in English Midland towns. Edinburgh, Glasgow, Dundee and Aberdeen have all reported an increasing incidence of *gravis* infection of recent years; whereas five years ago *gravis* infection was relatively uncommon it is now in some Scottish towns the predominant infection. It is not surprising, therefore, that a considerable proportion of fatal cases of diphtheria nowadays are of *gravis* type, although it can hardly be true to say, as appeared in a report of the conference, that "in Dundee over 50 per cent of recent *gravis* cases died." There is need for research into the epidemiology of *gravis* infection, with a view to ascertaining, for instance, whether any particular areas of cities are acting as pockets of *gravis* infection and for the close study of diphtheria among immunised subjects and of fatal cases in particular. One would like to assume that these matters are receiving the earnest care of public health authorities. There can however be no doubt about the wisdom of the central department in urging on immunisation. Criticism would be turned on any delay in adopting such a course. If the people of Scotland have this serious problem set out with honesty of purpose, their coöperation will be secured.

BLOOD TRANSFUSION CENTRES

The Government have agreed to make a grant to the Scottish blood transfusion service towards establishing two centres for the processing of plasma for use in hospitals. One centre is to be under the direction of Prof. J. P. Todd; the other, directed by Dr. C. P. Stewart, is to be equipped with the first plant for the preparation of dried plasma to be used in Scotland. A whole-time mobile blood withdrawal team is to be attached to each centre, so that the services of donors in the country may be used more freely than has been possible.

GRENFELL ASSOCIATION.—This year the association are not printing any Christmas cards. But the work of the mission in Newfoundland and Labrador goes on, and the association is also anxious to help the wives and children of the men who are now serving overseas. So instead of Christmas cards they are asking us to buy picture postcards, which have enough of the snow-and-sledge atmosphere of the north to carry Christmas greetings appropriately, but will also serve as agreeable bearers of everyday messages throughout the year. The cards may be ordered from the hon. secretary of the association, 66, Victoria Street, London, S.W.1, and they cost 2*d.* each.

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In England Now

A Running Commentary by Peripatetic Correspondents

THOSE charged with the duty of bestowing names have a responsibility which they do not always take seriously enough. How otherwise are we to account for the extraordinary names that dog defenceless infants through manhood to old age? War tends to add new terrors to these trials of nomenclature when the unprotesting infant is named after a general, a politician, or even a supply dump. Recently our hospital has been involved in a series of exercises involving casualty reception, and it appears that even such exercises must have names. Who chooses the names is not a question for ordinary mortals, but their range is almost as catholic as the pass-words of other days. The psychology of the chooser seems to run in cycles, for after a series of colourless inanimate efforts like axle, truck or station, he will suddenly dart into the very animate—rabbit, hound, ant or bee. It is customary to preface messages about these exercises with the label of the event, and we have from time to time been somewhat staggered to receive an exhortation beginning "Exercise Rabbit," or "Exercise Bee." One's first reaction is to a word of command, and it does seem a little strange, even in these days, to encounter an exhortation to "Exercise Rabbit." "Exercise Bee" is worse, for while the exercise of rabbit can make the exercisor look ridiculous the exercise of bee is not without its dangers. But it is surprising how quickly one drops into the vernacular and comes to receive a whole sheaf of messages all beginning and ending with "Exercise Bee" without the quiver of an eyelid. These messages touch us in two ways. They may send to the hospital a number of "casualties" in flesh or on paper, or they may require us to send some of our surgical pillars out into the wilderness to render assistance elsewhere. We do not complain about these things, though their novelty has worn off. It may be that we are instructed to stand by for the reception of "casualties" from 2 P.M. one day (or from 14·00 hours, as the official word has it) until 8 P.M. next day. Since these performances nearly always embrace Sundays they necessarily cancel week-end leave for everyone, and all that commonly happens by way of compensation is that we solemnly make "nil" returns at two-hourly intervals to a whole host of functionaries, seen and unseen, known and unknown. Usually at some time or other in the course of the performance one batch of "casualties" does arrive on our door-step, sometimes a mere scrap of paper to the effect that it represents *x* patients transferred from another hospital; sometimes a collection of warriors said to be more broken in body than they appear to be in spirit. These visitations usually descend on us in the early hours of the morning, and they inevitably involve the feeding and watering of the convoy attendants, if not of their burdens. Sometimes these burdens announce that they have come to stay for an indefinite period ("until transport can be arranged to take them away"), and, as can well be imagined, this latter development is apt to be coldly received; for the fitter a patient the more nuisance is he likely to be.

When we are instructed to send surgical personnel and equipment into a far country there is much beating of wings. Ultimately two chariots are laden, one bearing the cream of our personnel, the other the miscellaneous collection of equipment that constitutes the stock-in-trade of a mobile surgical unit, and with a triumphant blast they disappear in search of new worlds to conquer. Sometimes these expeditions last only for a few hours, sometimes they extend over night. I have never been privileged to see any of these field operations at close quarters, but I am credibly informed that they can be very entertaining. Sometimes they include a spirited discourse (flippantly referred to as "pep talk") from some military dignitary, the effect of whose oratory may be dimmed by some such untoward and untimely incident as the fainting of a nurse, or the hiccough of a surgeon, both events outwith the pharmacopœia of the performance. Occasionally fate sends our wanderers to spend the night in a country house, where they are treated right royally, to return to us with picturesque tales of well-being that only serve to depress their colleagues, who have been condemned throughout to the everyday. The activities of the peripatetic surgeons, like these of the stay-at-homes, never seem to assume formidable proportions; they solemnly set up shop and stand like tradesmen awaiting customers in the market square; but customers are scarce. One of the crowning penalties of these exercises is that they call for the submission of a report on them; and report we do, usually with brevity, occasionally with vigour, but always in our story adhering to the prescribed ritual, beginning as we end, "Exercise Bee . . . Exercise Bee."

* * *

In this country when a public servant fails in foresight, performance or energy we often take away his responsibilities and elevate him socially. Poor old Jones who made such a mess of the Ministry of Tics starts a new life of comparative harmlessness as Lord Neuralgia. This admirable method seems to reach almost a Chinese pinnacle of civilisation, but curiously enough the lone, disregarded prophets in the wilderness who suddenly are shown to be right, or at any rate less wrong than the popular prophets, are not rewarded and made ministers. There is a grudging, insular feeling in the mass of us who have been mistaken or misled which prevents their immediate acclamation, otherwise we might have recently seen Mr. Pritt as Lord Chancellor and Prof. J. B. S. Haldane in some very high post indeed. For years he has been a strong supporter of Russia, has preached the essential soundness of the Soviet system, and is a confirmed Marxist and Leninist. His wonderful little Pelican, "Science and Everyday Life," consists of seventy articles he wrote in the *Daily Worker*, and they deal with a glorious variety of subjects in a terse, witty and fearless way—Why bananas have no pips, Do continents move?, Atom smashing, Colliery explosions, Genetics. They who have the restraint might read one a day as a tonic. Personally I read the lot at a sitting, and am hungry for more. What admirable broadcasts they would make, but it is more than doubtful whether the B.B.C. would allow them. Yet any one of these little articles would make a most stimulating "go to" talk at 7.55.

* * *

Transfusion centres are apt to grow into monsters and as an itinerant progenitor of these war children one at times feels a little concerned. Is it all being overdone? Have we not already got enough plasma and serum to see us into the twenty-first century, and will not many decades of war have by that time reduced us to such a simple standard of living that our plasma-proteins will have been reduced totalitarian-wise into a standard amino-acid capable of synthesis in the laboratory? With the continuous call for scrap will our hæmoglobin molecule not think it best, in the national interest, to come off the iron standard and use chlorophyll as ersatz? Perhaps before such drastic changes are demanded the liver may be able to achieve a greater economy of iron, salvage of the erythrocytes being effected by the reticulo-endothelial cells to the slogan "use this envelope ten times before discarding it."

* * *

Mention of cucumber seeds with their copper-protein enzyme in THE LANCET of Nov. 8 (p. 571), suggests that I ought to set out my great copper conserving scheme. I suppose it is the result of all these anti-waste slogans, but I find myself developing an anti-waste or salvage mind. I am concerned, in the Quaker sense, with Fehling's solution. All biochemists unite to tell us that Fehling's solution is unreliable and only Benedict's solution should be employed in the clinical laboratory test for sugar. Despite this warning, or perhaps I may now say ukase, the twin bottles for Fehling's test still live side by side in thousands of test-rooms. I cannot boast that I have visited all these thousands, but random sampling, so to speak, has shown that Fehling is never absent. Now my great scheme is to conduct a Fehling's collection campaign. Let us take this chance of a biochemical advance by educating ourselves universally to use Benedict and Benedict only. Let us save copper by collecting all the misused bottles of Fehling's (blue) solution. A simple process will yield copper. If all the Fehling's (blue) solutions now mistakenly displayed in hospitals and consulting-rooms were collected, we should have enough copper to make—whatever is made from copper. I am sure it would save

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several shiploads (vide M.O.I. film passim). Details of collection can be worked out locally. The great thing is to sacrifice Fehling in a twin campaign of biochemical efficiency and copper economy. Who was he, anyway ?

* * *

The great day had arrived at last, and the A.D.M.S. was due within the next two hours. He was to inspect, of course, the main cook-house of the battalion, and that of a small outlying post, after the good lunch we had arranged to give him had taken its accustomed place in the day's routine. As messing officer I had dealt with assistant directors of medical services before, and knew just what they liked : the spotless roller towel hanging up, the hand wash-basin with the soap laid out conspicuously *and* the nail brush. To the cook-house of the small outlying detachment I sent a young subaltern, with instructions to get the place clean ; cleanliness, I explained, was the keynote with any A.D.M.S., and it did not matter so much how the food was cooked, what was being cooked, the qualifications of whoever was cooking it, so long as everything connected with the cooking of it was hygienic. Nor was it vital to see that the contents of the swill-tubs had the correct swills in them, so long as they were clean outside and had the lids on them. I went to my own cook-house for a final look round with a feeling of confidence ; everything was completely A.D.M.S.-shape—tables clean, rims of the mustard pot covers shining (a point they are very hot on) and the cooks' faces washed. Those men who seem to be incapable of keeping themselves clean had been liquidated for the morning by the staff sergeant cook. This was going to be a much easier visit to get through than one from one of those expert-on-food generals who may ask awkward questions about the menu, or demand an exhibition in pastry-making from some poor cook. When the victim gets all his quantities wrong from nervousness, the general usually suggests kindly that perhaps he has not done any pastry-making, but has always cooked the vegetables ; and the cook will eagerly clutch the straw and agree, whereas he has really been making beautiful apple tarts for the past year. Oh yes, I thought, this would be much easier than that sort of visit.

I went into the back-yard to wait ; I should be warned when the party arrived by the main road. That potato must be moved : I bet I can putt it behind the dustbin with my stick in three. One—that was a useful shot. Two—I do wish these A.D.M.S.s would come the normal way and not arrive suddenly by the back entrance. "Good-morning, Sir," I exclaim with a hollow laugh. "Yes, sir, quite a good putt. I was just going to put it in the swill tub." What ? Have all my cooks been on a cook's course ? This isn't fair, you're supposed to look at my beautifully scrubbed tables. Look at this drain, sir ; is it clean ? It is ! "Well, sir, I am not quite sure if all the cooks have been on courses or not. I shall have to refer to my files. I beg your pardon, sir ? How do we make a baked rice pudding ? " This is an outrage. What about looking at the cook's spotlessly clean hands, the absence of flies in the larder. Hi ! you can't pass that meat-store. We've spent hours cleaning it and chasing the blue-bottles out. Besides there's the new piece of butter muslin over the bacon, specially arranged for you. That's the last straw, passing the mustard pots without picking up one lid to see if it was clean. Not one ! And then, to cap all, asking one of the cooks how to make a jam tart. He's only there to look clean. It's not fair, I say ; this Army's getting too modern.

* * *

I travelled back from an aunt's funeral the other day with the family solicitor, a judicious, nutty, glass-of-sherry-on-the-sideboard little man. We fell naturally to discussing the old lady and the indomitable pessimism which was her characteristic. Ninety years old in the first week of September, 1939, she philosophically remarked, "Well, I'm afraid this is the last war I shall see." And so it was. The lawyer quoted to me Sam Weller's words to his father—"Well, ve must all come to it, one day or another ; there's a Providence in it." And the father's rejoinder—"Of course there is ; wot'd become of the undertakers without it, Sammy ? " This led us on to his experiences (copious, it seemed) of morticians. He spoke of their tact and their fees. The latter, he thought, were stepped up pretty high, but then the relatives felt it would be disrespectful towards the departed to dispute the bill. "'And they always get paid first," he added feelingly, "before the doctors and long before the lawyers." Then he asked if I'd seen that recent prosecution at Liverpool assizes of the two undertakers' men who filled the coffins with sand. In the confusion after an air-raid they had been unable to find the bodies in time ; the funerals were overdue, the relatives were waiting and something had to be done. It looked an unsocial and unsettling kind of deception, but, instead of being tried for a public mischief, they were just charged with the offence of making a false entry contrary to the burial laws. They pleaded guilty and their counsel claimed that they were really public benefactors ; they had done a charitable act ; they thought the corpses must have been interred in a communal grave and they carried on with the funeral ceremony so as not to disappoint the mourners who had assembled to mourn. I asked the man of law how the deception came to be detected. He said the bodies were discovered afterwards. What happened to them ? Was there another funeral ? He didn't know. Continuing in this macabre vein, he offered me another bit of gossip floating round the undertakers' world. A patient died of some rare disease. His widow acceded to a request from the hospital authorities that they should be allowed to make an autopsy of such an interesting case. The body, with some of the organs removed and rather roughly sewn up, was eventually deposited at the mortuary. Meanwhile a woman in the neighbourhood had given birth to a still-born child, and, not wanting the fuss of a funeral, asked a member of the mortuary staff if he could do anything about it. As another of these "charitable acts," he said he would see what could be done. The sequel was a surprise for a most respectable firm of morticians when its representatives came to prepare the corpse of the hospital patient for decent interment. They found the fœtus inside his empty abdomen. What criminal offence had been committed and what disciplinary action followed I never learnt, for at this moment, rather to my relief, the railway carriage filled up with young men and maidens whose chatter was of livelier things.

* * *

It was the memory that fried tench with mushrooms (or at a pinch sliced young puffballs) is no mean dish that made Uncle take the boy to a pond which he had not fished for thirty-five years. Everything seemed just the same as of old—the smell of the water mint, the reflecting and expectant stillness of the water, even the same old clumps of *Potamogeton natans*. How proud Uncle had been when he learnt that name from an elder brother forty years ago. The white quill float pointed like an uplifted finger, commanding silence ; on the other side of the pond the boy's red and green cork one stood perkily, almost aggressively, upright, the moorhen's lovely yodel came from the rushes at the shallow end, everything seemed exactly the same. "Anything doing ? " asked Uncle after a while, lowering his voice for the tranquil carrying water. "I thought I had a nibble just now," said the boy, louder. Probably a lie, a lie in the best tradition, full of hope and optimism. How like that other boy, even the voice. "I've got one, hurrah ! By Crumps, it's a wizard. Come and look, Uncle ! " "All right, all right, you needn't make all that noise about it. You'll frighten the others." Uncle didn't really mind a hoot about the noise, but he was repressing emotion and was therefore a bit irritable, for that other boy has been dead twenty-four years now, waiting in some Mespotamian sand for the tide of battle to flood again. "Qui procul hinc . . ." Uncle admires the fat pounder, lying in the grass, the fine mosaic of his tiny scales, the gold-green sheen, the ruby eye turned down as though to watch the pouting mouth. Uncle remembers there was a French master who used to make the same sort of lip movements when pronouncing "ou," and they called him The Tench, which degenerated unjustly into Stinker. Uncle relates this trivial incident to the boy who receives it politely as some Chaucerian, or at any rate Edwardian, coarseness. Uncle was about to show him how to distinguish the sex by the pelvic fins ; better not. He tiptoes back to his rod resting on the rushes. Thirty-five years ! Tench will probably be the same in thirty-five thousand, gobble up brandling, hook, and all, then look surprised when they gasp on the bank. Poor fish. Few come back to teach them, few

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come back. But what of us? What was the boy talking about coming along here? Hurricanes and Tomahawks, canon or machine guns. What was that other boy always reading? "Famous Battles," "The Green Curve." We are all poor fishes. The white quill bobs twice and glides under the water.

Letters to the Editor

THE DERELICT SWAB

SIR,—I have read with great interest the annotation on surgery and the common law in THE LANCET of June 7 (p. 729). You very much doubt whether the courts of common law will agree with the surgeon's view expressed by Mr. Zachary Cope, that, if he receives an assurance from the theatre sister that all the swabs and instruments have been accounted for, the surgeon may sew up the abdomen and be relieved of responsibility if one remains inside. I agree with your view that the precautions the surgeon must take to ensure that the swabs are all removed must remain a question of fact in each particular case. The theatre sister's assurance is not a sufficient protection even when supported by that of another member of the theatre team.

May I relate an illuminating experience? Many years ago, in the course of an emergency operation late at night for appendicitis in a child, I inserted a protective swab into the abdomen. The appendix was removed and the incision closed. While driving home in my motor-car the thought suddenly struck me that I had left the swab in the abdomen. I returned to the hospital and questioned the theatre sister, who assured me that the swab had been removed. I then turned to my house-surgeon, who gave me the same assurance. I replied that I was not satisfied, and asked the theatre sister to count the swabs before me. She did so, and one was missing. I had the patient returned to the operating theatre, and removed the swab.

This experience led me to adopt the view that it is the surgeon's duty to accept the responsibility for a derelict swab. If he makes an invariable practice of never putting a "loose" swab into the abdomen, he will never leave one there.

Adelaide. H. S. NEWLAND.

ENURESIS

SIR,—Dr. Raymond Greene wonders why I should think it relevant to mention cases of exanthemata occurring after the onset of enuresis. The answer is that enuresis often takes a turn for the worse after one of these infections; this was so in a large proportion of my cases. The difference between cases showing much dilatation of the upper urinary tract and cases showing little was that the greater the dilatation the more constant the evidence of infection in the urine. So well does this rule apply that in the lesser degrees of dilatation, so commonly seen among enuresis cases, it is unusual to find evidence of infection in the urine at all; but where infection does exist it is relatively easy to get rid of it. In cases where there is much dilatation, however, it may be impossible to achieve sterile urine; modern urinary antiseptics often reduced the degree of infection, but failed to clear it up completely. The difficulty in attaining this end usually seemed to have a direct relationship to the amount of dilatation present. The involvement of the urethra in the inflammatory process in all the cases of vulvitis was a personal observation. Usually it could be detected by merely inspecting the external urinary meatus. I duly acknowledge the correction concerning the sites at which the ducts of the glands of Bartholin open.

My studies on the calibre of children's urethras were always made under general anæsthesia at the termination of an endoscopy, on patients whose urinary tracts required such investigation. It would be difficult to find an objection to such a procedure on psychological grounds. The question whether there might be any relationship between benefit from treatment and a threat of a further instrumentation can be answered finally now and in the negative. Since the treatments were carried out under a general anæsthetic the patients had no knowledge of what was done or of what might be done on a future occasion.

I can assure Dr. Arnold Heymann that in my experience spina bifida occulta, epilepsy or idiocy have no relationship to the great majority of cases of enuresis. I went carefully into the question of spina bifida occulta in a number of patients. Every case of enuresis with threadworms was admitted to hospital and given treatment to get rid of the parasites. I was never able to satisfy myself that they were a causal factor. Since enuresis is more common among the under-nourished than the well-nourished it would be surprising if an improvement in the diet of the former did not reduce the incidence of the complaint. The signs of inflammation at the neck of the bladder in cases of enuresis are not likely to be seen by the cystoscopist unless the child is in the lithotomy position, because they are usually present only at and adjacent to the internal urinary meatus. It would be unreasonable to assume that they are caused by the instrument when an inspection of the posterior urethra shows more important inflammatory changes in the immediate vicinity. The question of how many leucocytes in the urine are to be regarded as evidence of infection is one I am not prepared to debate.

Harley Street, W.1. H. P. WINSBURY-WHITE.

SIR,—Dr. MacLeod's voluntary and diurnal attack from the heights has damped but not drowned me. I am sorry that he found "turbid" a letter which some have found lucid to the verge of the brutal, and surprised that he should have bothered about a criticism which he a little rudely dubs "senseless" and unworthy of a serious reply. My question about the relation between dilatation and infection, which seems to have caused him so much annoyance, may be clearer to him if I put it this way: if patients have both upper urinary tract dilatation and infection below, how does one know which is primary with enough certainty to divide the cases into two groups? As to Bartholin's glands, Dr. MacLeod will, I hope, forgive me if I refuse to embark on a lecture on elementary anatomy. It will save us both a lot of time if he will refer to Gray's "Anatomy."

Whitchurch, Aylesbury. RAYMOND GREENE.

CARLOS FINLAY AND YELLOW FEVER

SIR,—I am fully satisfied with the general trend of your criticism of my book on my father's work on yellow fever (Aug. 9, p. 167), but must clear up some misunderstandings in connexion with his experimental cases. Owing to their lack of severity and their small number in comparison with the inoculated cases you are right in sustaining that they cannot, by themselves, be considered as proof of his theory—this required the later sanction of the more convincing experiments of the U.S. Army Yellow Fever Commission—but what I consider unjust is the supplementary statement, made in most Anglo-American writings, that he did not produce any positive experimental cases. This statement is based solely on the ground that his positive results did not comply with the narrow time-limits fixed by the commission, limits which later investigations have proved not to be as exact as at first supposed. As regards the incubation period in man my father's views have always coincided with those of the commission in that yellow fever is only infective in the first days of the disease, protracting the infective period up to the sixth day. N. P. Hudson and C. B. Philip, however, proved in 1929 (*J. exp. Med.* **50**, 583) that yellow-fever monkeys are "mosquito-infective" before the appearance of fever, all through the febrile period and even after death. As regards the duration of the extrinsic incubation period, J. H. Bauer and Hudson in 1928 (*Ibid*, **48**, 147) showed that the yellow-fever virus can be transmitted through the bite of the mosquito on or after the 9th day. Aragão noted in 1929 (*Brazil-med.* **43**, 1481) that one lot of mosquitoes became infective as early as 4 days after ingestion of the virus, and in 1932 N. C. Davis (*Amer. J. Hyg.* **46**, 163) showed that:

"1. The extrinsic incubation period of yellow fever in *Aëdes ægypti* was shortened at high temperatures and prolonged at low temperatures.

2. The ability to infect was acquired after 4 days at an average temperature of 37° C., after 5 days at 36° C., and 6 days at 31° C.

3. When stored at room temperatures averaging 25·1° C. *Culex stegomyia* mosquitoes became infective at the end of 8 days; when the room temperature was 23·4° C. they were infective when tested at the end of 11 days but not at the end of 9 days.

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4. Infectivity appeared after 18 days at 21° C.
5. Mosquitoes were not infective after 30 days at 18° C."

This shows that the basis of a too short mosquito incubation is wholly insufficient to lead us to discard my father's positive cases in the presence of other data such as proper preliminary isolation; clinical symptoms of mild yellow fever (sudden onset, followed by a febrile course with a remission on the second or third day and a final defervescence, accompanied by slowing of the pulse, bleeding of the gums, albuminuria and jaundice); followed by immunity through a span of years of living in a country where yellow fever was endemic. It would have been more satisfactory if my father had allowed his infected mosquitoes to incubate longer, but although he realised this possibility as far back as 1891 (p. 78 of my book) conscientious scruples held him back, limiting his objective to the immunising of his inoculated subjects by mild attacks of yellow fever, even if this meant that his findings were not always convincing to others.

Havana. C. E. FINLAY.

GRADUATION AT AN EARLIER AGE

SIR,—Dr. Paterson's article leaves me a trifle perplexed. Surely the bright boy can still matriculate at 16, take his first M.B. examination from school or from technical college and enter his medical school at 17. Is it true that he is now *compelled* to wait until 18 or 19 before starting his medical training at all? There are some for whom it is financially necessary to complete their training as soon as possible. Such was my own position and I would therefore think it a pity to force those in like case to turn to other fields. But I would not argue from this that qualification at or about 21 is a good thing. For one thing it involves some sacrifice in general education, and for another it forces the individual to assume even during his student years responsibilities for which he may not be sufficiently matured.

Dr. Paterson states that it is a "psychological fact" that the intellect of a boy of 16 has already been mature for two years. I am sorry but I do not believe him unless he is using the word in a sense all his own. The term is a hard one to define; intelligence, it has been said, is what a psychologist measures when he measures intelligence, but even adopting this pragmatic definition there is evidence to suggest progressive maturation until at least 16. If other aspects of mental life be brought into consideration (and they cannot be left out) the process of maturation continues far longer. Indeed, there are matters which one can "learn" at 30 which would be beyond one's scope at 20.

In general, therefore, it would surely be better to encourage, though not to compel, the medical student to carry his general education a little further and to qualify a little later. Apart from Latin and Greek, I should think that he would benefit from some knowledge of philosophy and statistics which he now sadly lacks! I agree that this raises the whole question of late marriage, which would surely be better solved by state scholarships on an adequate scale. If we are to have in the medical profession those who are really suited to it and not just those whose finances will stay the course, some such subsidy will be necessary anyway.

The Cassel Hospital. C. H. ROGERSON.

ACUTE POLYRADICULONEURITIS

SIR,—The advancement of medicine must necessarily be associated with the appearance of new terminology, yet today there seems to be a facile tendency for the adoption of nomenclature and phraseology, particularly if highly sounding or of continental origin, without sufficient regard for their soundness or suitability. In some instances, this may be due to the inherent inferiority substratum in the British character which permits the belief that native enterprise is of a lesser quality than that of the foreigner. One sees this feeling prevalent in most intellectual spheres, whether music, art, science or medicine, and one wonders why. It was probably this self-effacement rather than the desire for progress which led to the eager adoption in this country of the Basle anatomical nomenclature, a scheme sponsored mainly by a collection of German booksellers to whom such expressions as Astley Cooper's ligament or Hunter's canal were anathema.

The term radiculoneuritis came into prominence about 1916 and may have originated in France. Recently, it has been used to refer to a condition generally known as acute polyneuritis. Those who employ the new edition do so no doubt because they consider it to be an improvement, thereby indicating indirectly that involvement of the nerve roots is of sufficient importance to warrant its inclusion in the title of the disease; whereas in fact it is known that the most evident lesion is found in the extra-spinal portion of the nerve tract. Thus, Holmes in his series of cases declared that examination of the nerve roots disclosed no abnormality whatsoever and this finding seems to be general. It should also be remembered that anatomically the term radicular nerve is often applied to the conjoined portion of the nerve roots formed by the junction of the anterior and posterior roots. An inflammatory lesion affecting this portion of the nerve tract could quite properly be called radiculoneuritis. Thus the term itself can hardly be considered an improvement on anatomical or pathological grounds, nor does the clinical side furnish any additional support. The picture of an acute spreading paralysis may be produced by some half-dozen conditions all of which show certain changes in the spinal cord. This finding applies also to acute polyneuritis in which the toxic process shows a selective affinity for the neurone as a whole, so that the term polyneuronitis as suggested by Russell Brain is in this respect more suitable. But in the absence of a more exact knowledge concerning the nature of the malady there seems little point in substituting one inadequate designation for another, even though it may sound more modern.

London, S.W.3. J. H. MULVANY.

LIGATION OF PATENT DUCTUS ARTERIOSUS

SIR,—To those cardiologists whose enthusiasm has been fired by the brilliant exploits of some of our thoracic surgeons, I commend the perusal of a thoughtful and temperate address on the Newer Surgery of the Heart and Large Vessels, by H. M. Marvin (*Bull. N.Y. Acad. Med.* October, 1941). The operation mortality of ductus ligation in these American cases is astonishingly low—only 4 operation deaths out of 42 cases. Nevertheless, like Mr. Mulvany, I wonder if this operation is often justified. Surely the predisposing factor towards bacterial endocarditis in these, as in other cases, is the presence of an avascular bed, on which bacteria and fibrin are deposited from the blood-stream. Ligation of the ductus can only modify the conformation of this avascular bed, and in any case by the time the diagnosis is made bacteria and clot have probably already been implanted in the pulmonary artery opposite the entrance of the ductus. I agree again with Mr. Mulvany in the possibility of an arrest, and perhaps of cure, of bacterial endocarditis in these patients without surgical treatment. I have at present under my observation a lady who has been symptomless and working since September, 1940, after treatment in February, 1940, with heparin and a sulphonamide of a bacterial endocarditis implanted on a patent ductus.

With regard to the non-infected case, it will be interesting to see what is the expectation of life where ligation has been performed during infancy or childhood. But we may have to wait for many years before evidence is convincing that life is prolonged by this somewhat hazardous operation.

London, W.1. MAURICE CASSIDY.

VITAMIN E

SIR,—In your leading article of Aug. 23 you reviewed the literature on vitamin E in the treatment of muscular dystrophy and motor-neurone degenerations. Your conclusions were that vitamin E is of little practical value, though "that there is something behind this no-one can doubt." The leading article in the *British Medical Journal* this week states: "We find nothing yet to persuade us that any human disease or any disturbance of childbearing or locomotion in man is due to a deficiency of vitamin E, or is alleviated by treatment with it." I have read again the papers on which these two leading articles were chiefly based, and I cannot agree that they justify any statement that vitamin E is of little or no value. To avoid repetition I shall only examine in detail those papers dealing with muscular dystrophy, since the same criticisms are applicable in part to the papers on nervous degenerations and, indeed, to the treatment of all deficiency diseases.

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In muscular dystrophy some muscle-fibres are normal, some are completely replaced by fibrous tissue, and some are degenerating but are still present. It is only the function of these latter fibres which can be improved by any form of treatment. In children getting worse rapidly there are many such fibres, and so a great improvement is possible. In adults, in whom the disease has been slowly progressive for many years, there are only a few degenerating fibres present at any one time. The muscular weakness is essentially due not to these fibres but to the loss of those which have completely degenerated during the long course of the illness. In adults, therefore, little or no improvement is ever possible, though the disease can be arrested. Bearing these facts in mind the negative results of vitamin-E therapy reported from the Mayo Clinic (Eaton, L. M., Woltman, H. W. and Butt, H. R. *Proc. Mayo Clin.* 1941, **16**, 523), by M. M. Doyle and H. H. Merritt (*Arch. Neurol. Psychiat.* 1941, **45**, 672), and by G. Fitzgerald and B. McArdle (*Brain*, 1941, **64**, 19) lose much of their significance, since in a total of 20 cases treated only 5 were children. J. W. Ferrebee, W. O. Klingman, A. M. Frantz (*J. Amer. med. Ass.* 1941, **116**, 1895), however, have also reported negative results in a series of 13 children, so that there are 18 cases in all which have not responded to treatment. These, numerically, are more than balanced by the children who have improved, according to S. Stone (*J. Amer. med. Ass.* 1940, **114**, 2187; *J. Pediat.* 1941, **18**, 310), G. E. Donovan (*Lancet*, 1940, **2**, 162) myself, and various personal communications from England and abroad. There are several explanations of these contradictory reports.

. . . *importance of not giving too much vitamin E.*—All the children who have improved have been given vitamin E either as whole wheat germ or as wheat-germ oil and yeast, the amounts not greatly exceeding those which could be taken in food. The children who have not improved have all had synthetic vitamin E as well as, or instead of, the natural forms, and the total amount taken has been very large. Most of the children, indeed, received so much vitamin E that they could only have obtained the same amount from their diet had they eaten each day three times their own weight of bread from which the wheat germ had not been removed. It seems most unlikely that these amounts of vitamin E can ever be required, while it does seem likely that they are harmful. For the muscles themselves probably destroy any surplus of vitamin E, and therefore their degeneration is likely to be hastened when they are confronted with the strain of destroying amounts of vitamin E many times as large as could ever be provided by any diet.

. . . *importance of giving other vitamins and zinc and manganese in their correct proportions.*—There should be some relationship between the amounts of the various vitamins, and also minerals, in the diet. For instance the storage of vitamin A is affected by vitamin E, vitamin D needs a certain calcium-phosphorus ratio to develop fully its antirachitic activity, and there is an optimum ratio between manganese and vitamin B for preventing the toxic effects which occur when large amounts of either are taken. It seems that those minerals and vitamins which are especially necessary to each other for their mutual metabolism by the animal body generally occur together in vegetable foods. So though we do not know enough to give the correct balance of vitamins and minerals by synthetic preparations, we can solve the problem when treating deficiency diseases by giving foods very rich in the particular vitamin the deficiency of which is causing the symptoms. In this way we shall automatically keep the correct proportions of the related vitamins and minerals and avoid the risk of excessive doses. In the case of vitamin E whole wheat germ is the best preparation, containing not only the B complex but also zinc and manganese, the distribution of the last two in foods being the same as that of vitamin E. Looked at from another point of view, once one postulates a deficiency of vitamin E one must also postulate a deficiency of all those substances chiefly found with vitamin E, and so one must give them as well.

. . . *importance of treating sepsis.*—Any mild chronic or recurrent sepsis, such as carious teeth or frequent colds, completely prevents any response to vitamin-E therapy. Probably the absence of any sepsis would have been emphasised in the negative reports on the value of vitamin E had its importance been realised. As sepsis is not mentioned in these reports it seems possible some children failed to respond because of some mild infective focus.

The disordered creatine metabolism of muscular dystrophy has been investigated by Fitzgerald and McArdle in 2 children for periods of 26 and 36 days respectively, and by Ferrebee, Klingman and Frantz in 2 children for 10 days. Vitamin E given throughout the investigations did not improve the metabolism of creatine. This was to be expected, partly because clinical improvement seldom occurs in under eight weeks and partly because the children were receiving excessive amounts of synthetic vitamin E.

Wimpole Street, W.1. FRANKLIN BICKNELL.

DAY NURSERIES

SIR,—Your report in last week's issue of the conference on day nurseries shows that a point was raised there which has usually been ignored in the past, and which in my opinion is not being stressed sufficiently even now. Most child psychiatrists would agree with me that the child's greatest need during its earliest years is for a mother's affection and attention. This is essentially a strongly *personal* relationship and cannot be adequately replaced by any nursery school however well run. Marguerite Dobbing's experience, as given in her letter to the *New Statesman*, is another discovery (however belated) of a truth that has been preached by child-guidance workers for some years. Miss Anna Freud hit the mark when she said, "Nursery schools had never been meant as a substitute for the home any more than welfare clinics did away with the need for the mother's care or child-guidance clinics with the need for education by the parents." The nursery school is not a home, and even a bad home is better than no home at all. The intuitive understanding on the part of mothers of this relationship with their children has a great deal more to do with the slow progress of the nursery-school movement than is generally appreciated. Just as many a mother, quite rightly in my opinion, clung to her child when the evacuation scheme was launched, so today she will only use the nursery school as a last, often desperate, resort. The care of an aunt or granny, as your report implies, is preferred as being more satisfactory. (With regard to evacuation, many a mother has told me: "I just couldn't send him away, he would never get over it.")

We must recognise that the break-up of family life occasioned by the war is a serious evil and not the least serious outcome of war conditions. I agree with Anna Freud that the nursery schools are trying to fill a serious gap, but we must admit it is only a second best. (There is a real danger that they may be used to blanket those essential social and economic reforms which are so seriously needed to maintain an adequate family life.) With her, I would plead for some place to be found in the scheme for the mother herself. For only in the security of the intimately personal relationship between mother and child can the child develop a real and stable character.

If further confirmation of these views were needed it is to be found in the experiences of the Jewish communal colonies in Palestine. There both mother and father work (on the land) and the children are cared for communally by skilled nurses. None the less, it has been found necessary, in order to get the best results, to allot definite times each day when the parents can take charge of their children. I recommend a study of the development of these communal nurseries to all interested in child welfare.

Leeds. H. EDELSTON.

TOWARDS A NATIONAL SERVICE IN CLINICAL PATHOLOGY

SIR,—Dr. Ponder's statement that the "comprehensive pathological service" now functioning in the county of Kent is "very much on the lines indicated" is hardly correct. The view expressed and reiterated by myself was that by its very nature clinical pathology can only properly be practised "in laboratories forming an integral part of a large and active hospital"; that it can only function properly "in a laboratory which is part of an institution for the treatment of the sick"; and further that it can only properly be practised by those in close and continuing touch with clinical work. On his showing the service described by Dr. Ponder meets neither of these fundamental requirements.

Wolverhampton. S. C. DYKE.

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Public Health

Health of New Zealand

THE annual report for 1940–41 of Dr. M. H. Watt, director general of health, records an exceptionally healthy year in an exceptionally healthy part of the world where public medicine has reached a high level of efficiency and is extending towards a complete national medical service. The European population of New Zealand in mid 1940 was 1,546,312, its birth-rate was 21·2, the highest rate since 1925, and its death-rate 9·25 against 9·2 in 1939. Infantile mortality, for which New Zealand has long held the blue riband of the world, sank to the record low level of 30·2. Of the 990 infants who died in the year, 521 failed to survive a week and 630 failed to survive a month. The neonatal mortality has remained almost unaltered at about 22·5 per 1000 live births for many years. Rather more than half of the deaths within the first month are certified as due to prematurity alone, but since prematurity is not per se a cause of death this means that about half of the neonatal mortality is unexplained and in the present state of our knowledge is inexplicable. Tuberculosis mortality was 388 per million, which is a low record for New Zealand, and, we believe, for any community exceeding a million. Cancer mortality, at 1202 per million, would on standardisation for age and sex work out to be not much different from our rate of 1600.

The statistics of the Maori population tell a different story. Their birth-rate was 48·9, infantile mortality 87·2, crude death-rate 17·5 and tuberculosis mortality 4132 per million. Excluding tuberculosis, the death-rate among Europeans would be 8·86 and amongst Maoris 13·37, so tuberculosis alone accounts for not quite half of the higher death-rate among the Maoris. Until recently, the native population of New Zealand, unlike those of the African dominion, colonies and protectorates, was little infected with syphilis, but this has changed for the worse in some districts. The health department is fully alive to this and is taking active steps to combat the spread of syphilis among the Maoris.

Among the many interesting sections in the report is that dealing with hydatid disease, which is probably more common in the islands—especially in the South—than in any other part of the world. There are about 120 new cases with 16 deaths each year, and the incidence does not decrease. When we hear that about half the sheep and cattle in New Zealand have livers or lungs infected with hydatid cysts and more than a third of the country dogs harbour the adult *Tænia echinococcus*, we do not wonder at the frequency of the human disease, or why it does not diminish. Measles, which three years ago spread over New Zealand in epidemic form of exceptional severity for modern times, caused but one death in 1940.

Infectious Disease in England and Wales

WEEK ENDED NOV. 1

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1204; whooping-cough, 1955; diphtheria, 915; paratyphoid, 35; typhoid, 20; measles (excluding rubella), 624; pneumonia (primary or influenzal), 553; puerperal pyrexia, 118; cerebrospinal fever, 102; poliomyelitis, 23; polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 123; ophthalmia neonatorum, 79. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 29 was 1296, including scarlet fever, 165; diphtheria, 297; measles, 22; whooping-cough, 492; enteritis, 21; chicken-pox, 31; erysipelas, 25; mumps, 5; poliomyelitis, 6; dysentery, 27; cerebrospinal fever, 10; puerperal sepsis, 12; enteric fevers, 36; german measles, 1; other diseases (non-infectious), 81; not yet diagnosed, 65.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 2 (0) from enteric fevers, 2 (0) from measles, 9 (3) from whooping-cough, 22 (1) from diphtheria, 59 (3) from diarrhœa and enteritis under 2 years, and 11 (1) from influenza. The figures in parentheses are those for London itself.

There were 7 deaths from diarrhœa at Manchester, 5 at Liverpool and 5 at Birmingham.

The number of stillbirths notified during the week was 157 (corresponding to a rate of 32 per thousand total births), including 17 in London.

MEDICINE AND THE LAW

The Diabetic Motorist

THE Belfast magistrate has dismissed an application by the police that a diabetic doctor should be deprived of his driving licence. The police contended that the reactions to medical treatment rendered the patient unfit to have proper control of a car. The physician to the biochemical department of the Royal Victoria Hospital, giving evidence for the motorist, expressed the view that, provided diabetes was properly controlled by insulin, there was no reason why the patient should suffer incapacity from insulin coma; he himself had some 3000 patients under treatment, including, along with many private motorists, bus drivers and engine drivers, and had no reason to suppose them a danger to traffic. The magistrate, observing that this was the first case of the kind in his experience, was not prepared to give effect to the application of the police and, in effect, disqualify possibly thousands of drivers who use the roads today with as much safety as persons who do do not suffer from diabetes.

The law in Northern Ireland is much the same as in Great Britain. According to section 5 of our Road Traffic Act of 1930 an applicant for a driving licence must "make a declaration in the prescribed form as to whether or not he is suffering from any such disease or physical disability as may be specified in the form . . . or any other disease or physical disability which would be likely to cause the driving by him of a vehicle . . . to be a source of danger to the public." If from the declaration it appears that the applicant does suffer from any such disease or disability, the licensing authority must refuse the licence. The form, as last prescribed in 1937, asks the applicant specifically to declare epilepsy or sudden attacks of disabling giddiness or fainting, any defect in movement, control or muscular power of either arm or leg, or any other disease which would be likely to cause his driving to be a source of danger to the public. While the police are quite entitled to prove, if they can, that a particular diabetic is unfit to drive, it would not seem proper to allow them to insert (in effect) the word "diabetes" in the prescribed form along with the word "epilepsy" if the Minister of Transport (or his equivalent in Northern Ireland) has not done so.

Obituary

FRANCIS CHARLES MARTLEY

M.D. CAMB., F.R.C.P.I., D.P.H.

Dr. Martley, who died on Nov. 2 at the age of 76, will be best remembered for the part he played in the welfare of the Medical Sickness, Annuity and Life Assurance Society. He was vice-chairman of the society in 1908 before it became a mutual assurance company and in 1930 was elected chairman of the board of directors, holding this office until his death. He had a quite unusual ability for figures and correlation of facts and though the small amount of Irish in his make up was occasionally evidenced by a provocative remark, it meant nothing for behind it one could see a kindly pair of eyes and a hidden smile. No-one could have laboured longer or more faithfully than he did for the society, the success of which was a source of great satisfaction to him, and his wise counsel will be greatly missed.

Francis Charles Martley was born in Dublin, and was educated at Rugby and Cambridge, where he took the natural sciences tripos in 1887. He entered St. Mary's Hospital with a science exhibition, qualifying in 1890, and later taking many higher diplomas. After being house-physician at St. Mary's and practising for a while at Buckhurst Hill, he went back to Dublin as demonstrator of chemistry at the R.C.S.I., and anæsthetist to St. Stephen's Hospital. In 1908, however, he returned to London as assistant in the inoculation department at St. Mary's, where he remained on the active staff for thirty years. At first he was largely engaged in teaching workers from all parts of the world, who came to learn

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about the opsonic index. In later years he was chiefly interested in blood grouping and carried out some research bearing on its value in paternity cases, in the course of which he made the interesting observation that group two (Moss) corpuscles phagocytose some 25% more bacteria than do group four corpuscles.

Dr. Martley married in 1892 Adelaide Amelia Strangman, who predeceased him in 1935. He leaves a son and two daughters.

STUART ALEXANDER TIDEY

M.D. LOND., M.R.C.P., S.F.D.

Dr. Stuart Tidey, who died on Oct. 29, at the age of 84, was born in Reading. His father was an artist and his childhood was spent largely at schools in Corsica, Switzerland and Germany. He studied engineering at the Crystal Palace for two years before he entered St. Mary's Hospital, where he graduated in 1886, later taking the M.D. Lond., the M.R.C.P. and the Swiss federal diploma after further study at Geneva. He had held the posts of H.S. and assistant pathologist at St. Mary's, and in 1890 he started practice in Montreux, remaining there until 1912 except for a brief interval in Florence, where he followed StClair Thomson. At Montreux he had a large practice both on the lakeside and at the climatic stations on the hills above. But his health giving cause for anxiety he went to settle in British Columbia where, after farming for a bit, he took the state diploma in medicine and joined John Antle's medical mission to loggers. The last war found him, though already 56, ready for fresh work, and he helped to fit out the hospital ship *St. George* and worked there till 1917 when he joined the medical staff of the Middlesex War Hospital, near St. Albans. Still spoiling for adventure he served 1920–31 as ship's surgeon for the Elders & Fyffes line. Very quiet and rather rugged in manner, L. P. writes, he always knew his job and the latest developments in it. He would come almost unobserved into a medical board at Napsbury and almost immediately he would say the few words making points that were in danger of being missed. His writings were few for a man of his originality and vigour; apart from some handy guide and travel books he published his experience of the use of compression in pulmonary lesions and of the drainage of empyema. He loved to discuss these matters and specially enjoyed any argument against his own theories.

At the age of 73 Tidey retired to Edgware where he could indulge his tastes for music, natural history and gardening. The progress of parkinsonism curtailed his physical activities, but he retained his mental alertness to the last. He married Georgiana Booth, who predeceased him, and leaves two daughters.

Medical News

University of Cambridge

During October the title of the degrees of M.B., B.Chir. was conferred on E. H. M. Gillieson and R. M. Stevenson.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Nov. 4, with Prof. Charles McNeil, the president, in the chair, Dr. Benjamin Reid (Hellingley, Sussex), Dr. J. L. Cowan (Penicuik, Midlothian), Dr. A. J. Rhodes (Edinburgh), Dr. A. D. Stewart (Edinburgh), Dr. Alexander Joe (Edinburgh) and Dr. J. B. Borthwick (Edinburgh) were elected to the fellowship.

Advisory Tuberculosis Committee

The name of Dr. Ernest Ward should have been included in the Ministry of Health committee on tuberculosis published in THE LANCET (Oct. 11, 1941, p. 437).

Prisoner of War

W.S./Captain J. H. Annan, M.B. Edin., R.A.M.C., has been posted as a prisoner of war.

Royal Society of Medicine

Short papers will be read at the meeting of the section of pathology on Tuesday, Nov. 18, at 2.30 P.M. On Nov. 20, at 2 P.M., the section of dermatology will hold a clinical meeting. On Nov. 22, the section of orthopædics will meet at Orpington Emergency Hospital, Kent, at 11.15 A.M., when Mr. C. Lambrinudi will deliver his presidential address. He will speak on the rôle of orthopædics in medical education. Short papers will also be read by other members, and in the afternoon there will be a demonstration of cases.

King's Physician

Lieut.-Colonel (temp. Colonel) Sidney Smith, F.R.C.P., R.A.M.C., has been appointed hon. physician to the King in place of Major-General R. C. Priest who has retired.

From Strasbourg to Strassburg

After an interval of twenty-three years the German University of Strassburg has opened for the winter session (*Dtsch. med. Wschr.* Sept. 19, 1941, p. 1046). Applications for admission were received from all parts of the Reich but those from Alsace were given preference and Alsatians form the bulk of the students. The new university has four faculties—law, medicine, philosophy, and science, and of the 100 lecturers who have been appointed, 30 hold posts in the faculty of medicine.

Presentations to Dr. Barnes

On Oct. 30 Dr. Stanley Barnes, retiring dean of the faculty of medicine of the University of Birmingham, was presented by the United Hospital with his portrait, painted by Mr. Harold Knight, R.A., in recognition of his many services over many years in the reconstruction and administration of the new medical school and hospitals centre. The Lord Mayor, who made the presentation, said that Dr. Barnes had been a master builder, and Prof. W. H. Wynn, M.D., who also spoke, acclaimed him as a brilliant physician, man of affairs and great citizen. In reply Dr. Barnes said that he had felt constrained to alter the career he had laid out for himself in research in medicine in order to take his share in the development of medicine in the midlands. His loss of private practice did not matter but he had also had to sacrifice some of his hospital work which, he said, "to me was the first element in my life." Dr. Barnes received a George III silver pint pot from the council of the university, the senate and the members of the faculty of medicine, and the medical students have also given him a piece of silver plate.

Appointments

BROADBENT, BERNARD, M.B. Camb., D.P.H.: deputy M.O.H. for Tottenham.

DAVID, GEORGE, M.D. Berlin, L.R.C.P.E.: temp. asst. M.O. for Hounslow.

KEMP, T. A., M.B. Camb., M.R.C.P.: medical registrar and blood transfusion officer at St. Mary's Hospital, Paddington.

Births, Marriages and Deaths

BIRTHS

FORRESTER.—On Nov. 8, at Llanelly, the wife of Dr. G. Stuart Forrester—a son.

FRENCH.—On Nov. 4, at Rawalpindi, the wife of Capt. J. M. French, I.M.S. (of Burgh Heath, Surrey)—a daughter.

HODGKINSON.—On Nov. 6, at Milford-on-Sea, Hants, the wife of Dr. H. L. Hodgkinson—a daughter.

JOY.—On Nov. 8, at Frome, the wife of Captain David Joy, R.A.M.C.—a son.

LASCELLES.—On Nov. 4, at Farnham, Surrey, the wife of Surgeon Commander W. F. Lascelles, R.N.V.R., Yarm, N. Yorks—a daughter.

MACDONALD.—On Nov. 7, at Barnt Green, near Birmingham, the wife of Captain William Macdonald, R.A.M.C.—a daughter.

ROBERTSON.—On Nov. 3, at Perth, the wife of Captain R. P. Robertson, R.A.M.C.—a son.

RYDER RICHARDSON.—On Nov. 6, at Whitchurch, Aylesbury, the wife of Dr. J. C. Ryder Richardson—a son.

WELLS.—On Nov. 6, at Oxford, the wife of Dr. L. R. A. Wells, St. Olave's Hospital, London—a daughter.

YOUNG.—On Nov. 10, at Woking, the wife of Dr. B. A. Young—a son.

MARRIAGES

BEACH—ELLIOTT.—On Nov. 8, at Leintwardine, Alan Avery William Beach, surgeon lieutenant, R.N.V.R., to Margaret Elliott.

MCOWAN—BACKHOUSE.—On Nov. 1, at Longdon-on-Tern, Salop, Bernard McOwan, surgeon lieutenant, R.N.V.R., to Margaret Clare Backhouse.

WATT—MATTINSON.—On Oct. 28, at Carlisle, George Watt, M.B., to Patricia Mattinson.

DEATHS

BARTON.—On Nov. 4, at Lindisfarne Road, London, S.W., James Kingston Barton, M.R.C.P., aged 87.

BROWN.—On Nov. 6, at Cambridge, Alice Evangeline Brown, M.D. Brux., L.R.C.P.E., of Upper Park Road, Hampstead.

FORDYCE.—On Nov. 6, at Tillicoultry, William Fordyce, M.D. Edin., F.R.C.P.E., F.R.C.O.G., consulting gynæcologist to the Edinburgh Royal Infirmary.

MCCREA.—On Nov. 8, Hugh Morcland McCrea, O.B.E., M.D. R.U.I., of Harley House, London.

MARTIN.—On Nov. 3, John Martin, M.D. Camb., surgeon captain R.N., retd.

MONRO.—On Nov. 3, at Richmond, Surrey, James Donald Rae Monro, M.D. Glasg.

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Notes, Comments and Abstracts

THE CASE HISTORY IN DIAGNOSIS

J. PLESCH, M.D. BERLIN, L.R.C.P.E.

DIAGNOSTIC methods employed in medicine have advanced, but insufficient attention has been paid to the importance of the case-history. If we do not discuss his case with the patient we bring medicine to the level of veterinary medicine. In giving a history the patient finds or loses his confidence, and discovers whether he is dealing with merely a man who has studied medicine or with a real doctor. We are led towards a diagnosis by the history of the patient and his illness, by the first impression we get of him and by every fact which our senses are capable of observing; these put us on the right track for deeper exploration of his illness. Diagnosis depends on association of ideas. Neglect of history-taking springs from the rapid development of factual knowledge and of objective methods of examination by physical, chemical, bacteriological and microscopic means. We have lost confidence in our intuitive abilities and do not use or rely on our five senses sufficiently; this is regrettable because medicine must always remain an art to which science is only the servant. In medicine we try to judge the relations of the various functions to each other; it is impossible to reach a diagnosis according to a mechanical scheme. Our judgment must depend partly on imaginative intuition, and we can only pass on to the student the method of making the bricks from which he must build the diagnosis.

Even in many teaching hospitals case-histories consist only of notes on age and sex, diseases of childhood, a few remarks on the family, the symptoms of the onset of the present illness, and a brief account of a superficial examination. Recent work on constitution and heredity and on significant psychological findings is ignored. Usually there is a description of the patient's height, physical development and colouring—in these days of photography. Even the passport office has replaced written descriptions by photographs. Simple photography, coloured photography and the cinematograph can tell more about family likeness, constitution, complexion, temperament and anomalies than any words. They also make it possible to record changes over a period.

History-taking must be accompanied by inspection because the first impression directs investigation. We must also note any constitutional and psychological anomalies. The conditions of the extremities may disclose the duration of the illness: a soft sole of the foot indicates long illness, tough palms hard work; the wrinkles of the face betray whether the temperament is gay, meditative, choleric or depressed; clothing, jewellery, or a tattoo mark all give something away. A small telangiectatic mole in the occipital region, a third nipple like a wart but erectile, hypospadias, cryptorchism, relics of gillclefts, polydactyly and birthmarks all have their psychological projections. Illnesses take a different course in patients with such embryological anomalies. A woman with masculine traits, recognisable by hairs of the pudenda reaching up to the navel, has an entirely different psychical make-up from a woman whose dermatographia shows her extreme femininity. The family history must not be confined to parents and brothers, sisters and children; Mendel's law demands that we should inquire further. It is not so easy to get at the truth about relations, since patients generally dislike disclosing other people's secrets; or the information may be inaccurate because the patient takes a flattering view of his family. Illegitimacy is seldom admitted. It is more difficult still to get at the truth about the patient himself. Exaggeration, understatement, distortion are not always intentional, they often occur because the patient is usually not at all clear about himself; inquiry then becomes a psychoanalytical examination. If we suspect insincerity, or that the patient is trying to disguise the facts, we must get at the truth by clever cross-examination. When the patient becomes aware of his tactical inferiority he will quickly change his attitude and become more confiding. We must, however, make use not only of the facts he tells us but of the lies, for they betray his weaknesses and are sometimes more revealing than the facts themselves.

* * *

A history of previous illness is as a rule difficult to verify. Acidity, liverishness, nervousness, indigestion, rheumatism and similar ambiguous expressions are used freely. Pains are misleadingly related to various organs—backache to the kidneys and sensations in the chest to the heart. The patient must be induced to describe his symptoms and it is pleasing to find how readily even uneducated patients choose the right words, how comprehensibly they describe a cramp, the sudden onset and gradual fading of a colic, the pain of angina pectoris or the distress of an asthmatic attack. By watching the patient closely as he tells his story, by noting his complexion and his gestures, we may find a short cut to the understanding of his trouble. At this stage he tells us what he himself thinks important. It may have little bearing on the essential disease, but we must pay attention to it in order that he may give vent to his feelings. "Les hommes avec le petit papier," described by Charcot, are found not only among the hyperthyroid; we must let them make their points, but circumlocution can be avoided by adroitly placed inquiries for other symptoms.

We must, of course, be cautious in accepting the patient's estimates of size or quantity. The appetite is always measured by comparison with the appetite of those about him, the state of the bowels by the number, not the size, of the actions; sweating is reckoned in changes of nightwear; it is difficult to get any estimate of the daily urine; hæmorrhage will be counted by the size of the vessel in which it is emptied; sputum is always a cupful; menstruation is estimated by the number of changed towels.

Few events are more significant in physical and psychical development than adolescence. The less disturbance there is during this transitional phase the more likely is the later sexual life to be normal, and vice versa. An otherwise incomprehensible illness may be explained by hormonal imbalance in those whose adolescence was disturbed. Delicacy and skill are needed to get truthful information about the sexual life, but a full inquiry will often evoke surprisingly rapid improvement in neurotic cases.

Have we perhaps overrated the value of objective methods of examination? Examination of organs or systems will enable us to localise the change in them, but it is merely a form of diagnostic sport to be able to assert that somebody died from cirrhosis of the liver, from pulmonary tuberculosis or from valvular disease. What we ought to find out is how it was possible for the patient to go on living at all before his cirrhosis, his tuberculosis or his incompetent valves killed him. This will teach us what adjustments the body makes to its diseased organs, and may point the way to compensatory treatment. We are turning nowadays from the study of dead pathology to that of living function, from the organs to the organism.

Physiology is only concerned with conditions in the normal body, and experiments often deal with such extreme states as starvation or of utter repletion—of intense activity of functions or of almost complete arrest. Experiments on organs and tissues in vitro are still too often taken to represent the actual processes in vivo. Such investigations cannot mimic the coördinated, automatic and compensatory mechanisms which operate in the living organism; they are only the separate stones in the mosaic. They do not show what made life possible when an organ was grossly damaged. Restitutio ad integrum is a rare thing in pathology; our treatment must aim at supporting the body's natural compensating mechanisms.

* * *

Collectively men can be regarded as statistics, but in practice the doctor must know the idiosyncrasies of each patient so that, for example, he can tell whether in an epidemic of typhoid that patient will be one of the 15% of fatal cases or not. In the relationship between the individual and the disease it is the individual who varies. For instance, two cases of stomach ulcer of similar size and location will not, as a rule, justify the same prognosis or treatment. A full case-history may indicate how and why the patient fell ill, or incurred an accident. There

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may be some incipient nervous disorder which delayed reaction time, or impaired coördination, or accident may be coupled with early signs of tabes or cerebral tumour, syringomyelia, arteriosclerosis, arthritis, or ocular or aural diseases. The case-history may throw light on such integrative functions as complexion, respiration, pulse, appetite, sweating, temperature, sleep, posture, gait, and weight.

The best way to assess the state of a function is to suggest to the patient an exercise which calls on that function and to watch his reaction to the suggestion. Thus one asks a man with cardiac insufficiency (even though he shows hardly any sign of it when at rest) whether he could run up five flights of stairs—the look of astonishment on his face will indicate plainly enough the presence of cardiac damage. The mere thought of the effort makes him profoundly anxious. The information derived from a test-meal is meagre compared to that which we may gather by talking to the patient about his favourite dishes. Offered a glass of melted butter, a man with high gastric acidity would accept it, whereas a man with hypo-acidity would register disgust at the mere thought. The psychophysical reflex is so graded that one might almost speak of "psychological titration" of the stomach juice.

But we must realise that our relation to the patient is reciprocal; we analyse him by his answers, he analyses us by our questions. It is this psychoanalysis of the psychoanalyst which creates mutual confidence and, alas, also disappointments. The task of history-taking is too important to be left to the younger members of the staff. A broad view, readiness to understand and sympathise, kindliness, ability to judge without severity, to encourage, instruct, advise and attract—all these are needed in the taking of a case-history, and in no phase of medical activity are experience and knowledge more necessary.

POLISH FACULTY OF MEDICINE AT EDINBURGH UNIVERSITY

AT the Royal Society of Medicine on Nov. 5 Prof. A. T. Jurasz, dean of the Polish Faculty of Medicine within the University of Edinburgh, addressed the history section on the foundation and achievements of the faculty. He described the events which led up to the creation of this university within a university. The occupation of Poland lost the Poles their academic institutions, research centres and libraries, and exterminated the cultural life of Poland as a whole. The Polish Medical Faculty was to a certain extent symbolic of the need for all countries to maintain the standards of Western culture in the face of the destructive power of Nazi Germany. The faculty was formed by the unanimous resolution of the Medical Faculty of Edinburgh, followed by the acceptance of the scheme by the senate; the inaugural ceremony, in the presence of the President of the Polish Republic, took place on March 22, 1941. The first academic year was rather concentrated because there were no holidays. It was carried through without a break, and the second year has now started. The enrolments in the first year were 77 and in the second year 120 students. The first person to graduate was a Polish officer-pilot in the R.A.F.; he took part in many flights over Germany, but nevertheless found time to prepare for his final examination. During the last academic year 640 hours of lectures were given for the first-year students, and 1160 hours for the fourth and fifth years. The laboratories, the lecture-theatres and the wards of the various institutions of the university are open to the Poles. Professor Jurasz suggested that something more than mere chance had determined that Edinburgh should become the seat of the faculty. There were old cultural links between the two countries. In the 18th and 19th centuries Scots came to Poland. Later Edinburgh University became a cultural centre for many prominent Poles, and they used the experience gained in Scotland in founding clinics and scientific institutions in Poland, and even in reforming the teaching of medical science in the University of Cracow. The foundation of the faculty was symbolic of the collaboration which would exist after the war.

Dr. J. F. Halls Dally, president of the section, pointed out that however much help had been given by others, Professor Jurasz was essentially responsible for the success of the enterprise. Dr. E. Ashworth Underwood suggested that after the war it might be possible to establish a small British faculty of medicine in various continental universities, thus permitting certain students to finish their studies abroad—and acquire a practical knowledge of the language and culture of the people among whom they resided. Sir Alfred Webb-Johnson expressed his great interest in the unique Edinburgh experiment, and Dr. W. Clarke Trotter discussed the historic relations between Poland and the University of Edinburgh.

The address was preceded by a small luncheon in honour of Professor Jurasz, and after the meeting a reception was given by the Polish Ambassador at the Embassy.

FAREWELL, CHOCOLATE SOLDIER

THE American Army has exchanged the chocolate ration of the soldier in the field for five pieces of hard candy, individually wrapped and in assorted flavours (*J. Amer. med. Ass.* 1941, **117**, 941). Recent fatigue tests at Minnesota University have shown that men have a greater energy output if they take sugar periodically through the day rather than in large quantities at mealtimes.

Sugar for the Services,
Candy for the troops—
A soldier shorn of sugar
Invariably droops.

If you want your soldiers
Stiffened at the waist
Give them sugar candy,
Flavouring to taste.

Forget Papa's instructions,
Forget Mamma's appeals—
The energetic soldier
Must eat between his meals.

MIDDLE INCOMES AT BRISTOL

THEIR honorary staffs have lately asked the Bristol voluntary hospitals if they will in future rigidly observe the B.M.A. scale. This means that except in emergencies nobody above the following income-limits will be admitted to the general wards or outpatient departments of the hospitals:

£312 married with dependants
£260 married without children.
£208 single without dependants.

The Bristol Hospitals Fund recognises the doctors' right to fix the line of income-demarcation above which they cannot afford to treat patients for nothing, and it also recognises the difficulties of those with incomes just above the scale, who can afford to pay for most of their medical treatment but cannot find the fees of specialist and surgeon. Anticipating the Nuffield provident scheme the fund has devised what it calls an intermediate contributory scheme. The name is dictated by ambition, for it is hoped soon to start yet another scheme for those with still larger incomes. The intermediate scheme was launched by Mr. Egbert Cadbury at a meeting of the fund last July. The fund has made an arrangement with the Bristol voluntary hospitals, by which intermediate members for the payment of 6*d.* a week can provide for consultation, operations and treatment for themselves and their dependants. People within the following income limits are eligible:

£416 married with dependants
£364 married without children
£260 single without dependants.

The only exception to this arrangement is the Bristol Eye Hospital, and even here a modified scale of fees has been arranged for members of the scheme. The scheme can only be operated through the fund.

The fund, as a contributory scheme, has no legal power to make grants to medical staffs, and the board of each hospital is therefore recommended to make a grant to their medical staff fund equivalent to a third of the amount they receive from the fund for treating the intermediate contributory scheme patients. The staff will also receive a quarter of any surplus that may accrue.

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ORIGINAL ARTICLES

THE COMMON SULPHONAMIDES
NOMENCLATURE, STRUCTURE AND USES

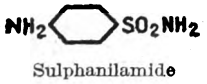
DENNIS G. ARDLEY, M.P.S.

WITH the inevitable increase in the number of compounds introduced into clinical practice for the chemotherapy of bacterial infections the need of an accurate and uniform nomenclature becomes urgent. Few modern British books on general medicine or the specialties make any attempt to achieve accuracy in the names used for these compounds, and the medical journals and encyclopædias tend to pander to the whims of their contributors instead of exerting strict control over the names employed. As a consequence, for example, all the names which happen to have been employed for the same chemical compound by various contributors to a textbook may appear in different parts of the index. Abstracts of articles from foreign journals often use for drugs names which are unfamiliar to readers in this country and in this way the chief point of the abstract may be lost. Conversely, proprietary names and erroneous nomenclature in English articles duly find their way into foreign abstracts to the mystification of readers. The practitioner who writes a prescription for "sulphonamide," ½ gramme tablets, or the surgeon who orders a wound to be dressed with sulphonamide powder, does not realise that what he has ordered is meaningless. The writer of an article who describes the treatment of a patient with "Prontosil" given by mouth in such and such a dosage overlooks the fact that there are three distinct chemical compounds to which this name is applied, and that all are given by mouth. The limit appears to have been reached by the author of an article on the use of various sulphonamide compounds who calmly announced at the outset that a particular brand name for sulphanilamide would be used to describe all the different compounds employed! It therefore seems opportune to suggest a few rules for general guidance. First, about dosage. The common practice of describing oral dosage in terms of number of tablets or volume of a suspension is inadvisable. A discussion once arose concerning an article on the treatment of gonorrhœa in which the dosage of sulphanilamide employed was in dispute until it was realised that the author was expressing dosage in drachms of a proprietary suspension. Dosage should always be expressed in terms of the active ingredient.

Most of the sulphonamides in common use have three kinds of name—a chemical name often occupying a line of print, a scientific synonym or pet-name, being the chemical name in a shortened form, and a various number of trade names. The synonym is the one intended for use in scientific articles, but unfortunately not all the compounds have one, and in some cases the trade name is at present unavoidable. Whenever possible only the full chemical name or its shortened form should be used, though it may sometimes be convenient to indicate once in an article which particular brand was employed.

SULPHANILAMIDE AND ITS EARLIER DERIVATIVES

Para-aminobenzenesulphonamide or para-aminophenylsulphonamide is the simplest and most widely used of these drugs, and being the amide of sulphanilic acid the name now commonly adopted of sulphanilamide is at once both accurate and brief, and the employment of proprietary names for this compound in medical literature is inexcusable. Of the forty or so trade names indicating proprietary brands of this compound the commonest ones in this country are Colsulanyde, Prontosil album and Streptocide, and sometimes the non-proprietary designations sulphonamide-P or P.A.B.S. are used. A proprietary brand much used in America is known as Prontylin. Some clinicians still do not realise that these names all stand for the same substance, and it is not unusual to hear of a patient's treatment being changed from one make of sulphanilamide to another, because he did not respond to the brand first ordered. Many other proprietary names for sulphanilamide, less commonly used than the four already given, are encountered, chiefly in foreign medical literature. In table I will be found 42 trade names for sulphanilamide, among which collectors may find choice and rare specimens. In the case of a few trade names encountered in foreign medical journals there has been no clue to the composition of the drug, or the composition has been variously described in different articles so that it has been impossible to be certain what the compound was. Sulphanilamide was included in the Fourth Addendum to the B.P. 1932.



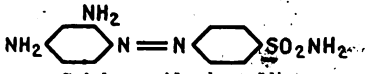
Sulphanilamide

TABLE I—PROPRIETARY NAMES FOR SULPHANILAMIDE

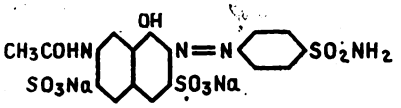
Albosal	Gombardol	Septamide album	Streptocom
Ambesid	Lysococcine	Septanilam	Strepton
Antistrept	Neococcyl	Septinal	Streptozone
Astreptine	Orgaseptine	Septoplix	Sulfamidyl
Bacteramide	Prontosil album	Stopton album	Sulfana
Bactesid	Prontylin	Stramid	Sulfanil
Cepticide	Pronzin album	Strepamide	Sulphanalone
Colsulanyde	Proseptine	Streptamid	Supron
Deseptyl	Proseptol	Streptazol	Therapol
Ergaseptine	Pysoccine	Streptocide	
Erysipan	Rubiazol-A	Streptoclase	

The simplest and most convenient classification of other sulphonamide drugs is to regard them as derivatives of sulphanilamide and as falling into two groups according to whether substitution takes place in the amino (NH_2) or in the amide (SO_2NH_2) portion of the molecule (table II). All the earlier compounds belong to the first class and are split up with release of sulphanilamide in the body. The more active substances introduced subsequently, such as sulphapyridine and sulphathiazole, fall into the second category, and these compounds do not depend for their action on the production of sulphanilamide.

The first compound to be employed was sulphonamido-chrysoïdin, which is 4'-sulphonamido-2 : 4-diaminoazobenzene, introduced into commerce under the name prontosil after having been called Streptozon. The name prontosil strictly refers, therefore, to this azo dyestuff but most English clinicians use it to designate sulphanilamide. If the word is used at all it should never be employed without qualification, so that there is no doubt as to meaning. Sulphonamido-crysoïdin is also known as Prontosil flavum or Prontosil rubrum. A less common trade name is Pronzin rubrum. A more soluble compound was later introduced for parenteral administration, which consists of a solution of the disodium salt of 4'-sulphonamidobenzene-2-azo-1-hydroxy-7-acetylaminonaphthalene-3 : 6-disulphonic acid, usually known in this country as Prontosil soluble, and sometimes as Prontosil-S or Prontosil II. Occasionally the name prontosil is applied to this compound instead of to sulphonamido-chrysoïdin, and in America, where it is given by mouth in place of the latter, it is known under the proprietary name of Neoprontosil, the "descriptive non-proprietary name" proposed for this substance by the Council on Pharmacy and Chemistry of the American Medical Association being azosulfamide. The name streptozon has been given to both prontosil rubrum and prontosil soluble, the latter having sometimes been distinguished as Streptozon II or S, and curiously enough the designation Prontosil red is sometimes used for prontosil soluble rather than prontosil rubrum. The Rubiazols include the French equivalents of the German azo sulphonamides and rival them in confused terminology. It is, however, sufficient to remember that in this country the name rubiazol is applied to a compound which differs from sulphonamido-chrysoïdin in containing a carboxyl (COOH) grouping, and hence is conveniently described as carboxysulphonamido-chrysoïdin.



Sulphonamido-chrysoïdin



Azosulphamide (Prontosil soluble)

In common with most other compounds of the first group in which substitution takes place in the amino

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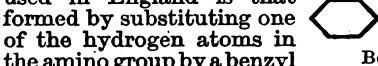
TABLE II

SULPHANILAMIDE DERIVATIVES, AND SULPHONES

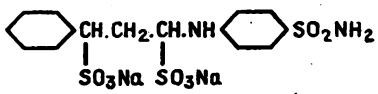
Synonym or abbreviated chemical name	Full chemical name	Proprietary names
SULPHANILAMIDE DERIVATIVES, FIRST CLASS		
Sulphonamido-chrysoïdin	4'-sulphonamido-2 : 4-diaminoazobenzene	Prontosil (flavum or rubrum); Streptozon; Pronzin rubrum
Azosulphamide	Disodium 4'-sulphonamidobenzene-2-azo-1-hydroxy-7-acetyl-aminonaphthalene-3 : 6-disulphonate	Prontosil soluble; Neoprontosil
Carboxysulphonamido-chrysoïdin	4'-sulphonamido-2 : 4-diamino-6-carboxyazobenzene	Rubiazol
Benzylsulphanilamide	*p*-benzylaminobenzenesulphonamide	Proseptasine (M. & B. 125); Septazine; 46 R.P.
Sodium succinyl sulphanilamide	Sodium *p*-succinylaminobenzenesulphonamide	Ambesid soluble; Septinal soluble
None	Disodium-*p*-(γ-phenyl-propylamino)-benzene-sulphonamide-α-γ-disulphonate	Soluseptasine (M. & B. 137); Soluseptazine; 40 R.P.
,,	Sulphanilamide lactoside sodium formaldehydesulphoxylate	Sulphanilamide L.S.F.
,,	Sodium-4-sulphonamido-phenylaminoethane α sulphonate	Sulphonamide E.O.S.
SULPHANILAMIDE DERIVATIVES, SECOND CLASS		
Sulphanilyl-dimethyl-sulphanilamide	*p*-aminobenzenesulphonamido-benzenesulphondimethylamide	Uleron; Uliron; Ulirone; D.B. 90; D.B. 373; Diseptal A
Sulphanilyl-monomethyl-sulphanilamide	*p*-aminobenzenesulphonamido-benzenesulphonmonomethylamide	Neo-uliron; Diseptal B
Sulphanilyl-sulphanilamide	*p*-aminobenzenesulphonamido-benzenesulphonamide	Diseptal C; Disulon
Sulphapyridine	2-(*p*-aminobenzenesulphonamido) pyridine or 2-sulphanilylaminopyridine	Dagenan; M. & B. 693; Eubasinium; Septipulmon; Pyriamid
Sodium sulphapyridine	Sodium 2-(*p*-aminobenzenesulphonamido) pyridine	Dagenan sodium; M. & B. 693 soluble
Sulphathiazole	2-(*p*-aminobenzenesulphonamido) thiazole or 2-sulphanilylaminothiazole	Thiazamide; M. & B. 760.
Sodium sulphathiazole	Sodium 2-(*p*-aminobenzenesulphonamido) thiazole	Thiazamide sodium; M. & B. 760 soluble
Sulphamethylthiazole	2-(*p*-aminobenzenesulphonamido)-4-methylthiazole or 2-sulphanilylamino-4-methylthiazole	M. & B. 838
Sulphadiazine	2-(*p*-aminobenzenesulphonamido) pyrimidine or 2-sulphanilylaminopyrimidine	..
Sulphacetamide	*p*-aminobenzenesulphonacetamide	Albucid; Sulamyd
Sodium sulphacetamide	Sodium *p*-aminobenzenesulphonacetamide	Albucid soluble; Sulamyd soluble
Sulphaguanidine	*p*-amino-N-guanylbenzenesulphonamide or sulphanilylguanidine	..
SULPHONES		
None	Diacetyl-4 : 4'-diamino-diphenylsulphone	Rodilone (1399 F.)
,,	4-: 4-diaminodiphenylglucoside	..
,,	Sodium *p.p'*-diamino-diphenylsulphone-N,-N¹-di-dextrose sulphonate	Promin

radical of sulphanilamide, these substances owe their activity mainly to the release of sulphanilamide itself in the body tissues, the coloured compounds being split at the azo linkage. Endeavours have been made to show that the azo linkage per se may play a rôle in their action, but all the important recent advances concern colourless compounds, and the dye-stuffs cannot but be regarded as being chiefly of historic interest.

Of the sulphanilamide derivatives belonging to the first group which are not dye-stuffs, the most commonly used in England is that formed by substituting one of the hydrogen atoms in the amino group by a benzyl group. This compound is para-benzylaminobenzenesulphonamide or benzyl sulphanilamide. It is known in England as Proseptasine or M. & B. 125, and in France as Septazine or 46 R.P. The drug is soluble in water only to the extent of about 1 in 25,000, compared to sulphanilamide which has a solubility of about 1 in 100. The sodium salt of the corresponding succinyl derivative of sulphanilamide—sodium para-succinylaminobenzenesulphonamide or sodium succinyl sulphanilamide—has been issued for parenteral administration under the name Ambesid soluble. There is also a product Ambesid, and it might reasonably be expected that this would be succinylaminobenzenesulphonamide itself, but in fact this is another proprietary name for sulphanilamide.



Benzylsulphanilamide



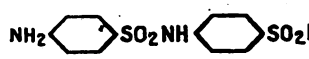
Soluseptasine

A widely used compound which is much more soluble than sulphanilamide and consequently more suitable for parenteral administration is Soluseptasine or M. & B. 137, known in France as Soluseptazine or 40 R.P. It is disodium-*p*-(γ-phenyl-propylamino)-benzene-sulphonamide-α-γ-disulphonate, the sodium sulphonate part of the molecule being the solubilising groups. No convenient non-proprietary designation for soluseptasine has come into use.

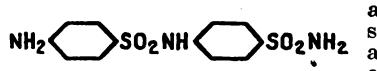
A soluble sulphanilamide derivative for parenteral administration, and one having a high sulphanilamide content, has recently been placed on the market under the name sulphanilamide L.S.F. It is described as sulphanilamide lactoside sodium formaldehydesulphoxylate. Reference has also been made to a compound called Sulphonamide E.O.S. and described as the sodium salt of the ethylsulphonic acid of sulphanilamide. It therefore appears to be sodium 4-sulphonamidophenylaminoethane α sulphonate. It has been tried clinically in cattle and man. Mutch (1941) has described some investigations on its pharmacology and activity and has given details of its use in 34 cases of cerebrospinal fever.

LATER DERIVATIVES

The first drugs of the second class were three disulphanilamide compounds, known originally as Diseptal A, B and C, and introduced from Germany. Of these the first, and the only one to come into use in England, is known as Diseptal or Uleron. It is also called Uliron, Ulirone, D.B. 90 or D.B. 373, and is para-aminobenzene sulphonamido-benzenesulphondimethylamide or sulphanilyldimethylsulphanilamide. Diseptal B is the corresponding monomethyl derivative, and is now referred to in German medical literature as Neo-Uliron. Diseptal C contains no methyl groups, being sulphanilylsulphanilamide. Sulphanilylsulphanilamide is available in America and on the Continent under the name Disulon, where it is used in the treatment of gonorrhœa. It is also known as "disulphanilamide," a name which, unfortunately, has also been used for the dimethyl derivative (uleron). Claims that uleron is valuable for the treatment of gonococcal, staphylococcal and anaerobic infections have not been substantiated, and the subsequent use of sulphapyridine for the treatment of gonorrhœa and the activity of sulphathiazole in staphylococcal infections have led to its falling into disuse. In



Sulphanilyldimethylsulphanilamide (Uleron)



Sulphanilylsulphanilamide

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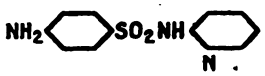
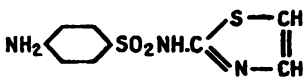
common with most other derivatives of the second class uleron is not broken down with the release of sulphanilamide but is eliminated partly unchanged and partly in a conjugated form.



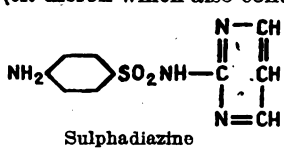
Sulphapyridine

An event of outstanding importance in chemotherapy was the introduction of the compound derived from sulphanilamide by substitution of one hydrogen atom in the amide portion of the molecule by a basic pyridine group, giving 2-(*p*-aminobenzenesulphonamido) pyridine. This was first known as T. 693, later introduced as M. & B. 693 and subsequently called Dagenan, a mutation on an Essex place name. To a non-chemist sulphanilylaminopyridine should not be too long to remember but the Americans christened the compound sulphapyridine, which name, although not accurately descriptive chemically, has been generally accepted. Sulphapyridine proved to have a much higher degree of activity than sulphanilamide, thereby extending the range of chemotherapy far beyond infections by sulphonamide-susceptible strains of streptococci. Pneumococcal infections were brought under control, a more potent weapon against gonococcal, meningococcal and gas-gangrene infections provided, and the effective chemotherapy of plague and staphylococcal infections brought nearer. A calcium compound of sulphapyridine has been placed on the market in Germany under the trade name Orsulon. It is issued in tablets for oral administration in the treatment of pneumococcal and other infections. In Stockholm a compound of sulphapyridine and salicylic acid, known as salicylazosulphapyridin, and marketed as Salazopyrin, has been used with success in rheumatoid arthritis and ulcerative colitis.



Sulphathiazole

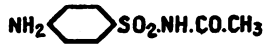
An even more active compound than sulphapyridine is the corresponding thiazole derivative 2-(*p*-aminobenzenesulphonamido) thiazole or 2-sulphanilylaminothiazole, usually called sulphathiazole, and also known in England as Thiazamide or M. & B. 760, in Switzerland as Cibazol or Ciba 3714, and in France as R.P. 2090. It has proved its value in the treatment of infections with *Staphylococcus aureus*, some of the clostridia, *Pasteurella pestis*, and various organisms found in urinary-tract infections, including *Streptococcus fæcalis*. Various compounds obtained by replacing one of the hydrogen atoms in the thiazole ring have been tried in therapeutics, and of these the name sulphamethylthiazole indicates the 4-methyl derivative—namely, 2-(*p*-aminobenzenesulphonamido)-4-methylthiazole, or 2-sulphanilyl-amino-4-methylthiazole (M. & B. 838). Owing to the danger of peripheral neuropathy from the use of these derivatives (cf. uleron which also contains methyl groups), and their greater liability to deposit crystals in the urinary tract compared to sulphathiazole itself, little more is likely to be heard of them.



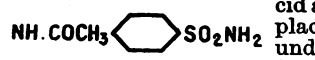
Sulphadiazine

Another heterocyclic derivative of sulphanilamide, the pyrimidine analogue of sulphapyridine, has recently been introduced in America; this is 2-(*p*-aminobenzenesulphonamido) pyrimidine or 2-sulphanilyl-aminopyrimidine. Sulphadiazine, as it is called, appears from the preliminary studies of American workers such as those of Finland, Strauss, and Peterson (1941) and of Long (1941) and his associates at Johns Hopkins Hospital to have about the same degree of activity as sulphathiazole and sulphapyridine on pneumococci and meningococci, to have an activity on *Staph. aureus*, and to have a high degree of activity on *Klebsiella pneumoniæ* (Friedländer's pneumobacillus). It has been tried in pneumococcal pneumonia, cerebrospinal fever, staphylococcal, streptococcal, gonococcal and other infections but the data at present available concerning its activity, toxicity, absorption, distribution and elimination are inadequate to predict its ultlmate place in chemotherapy.

Sulphapyridine and sulphathiazole being of low solubility in water are unsuitable for parenteral administration in solution, for which purpose their sodium salts are employed. The latter being compounds of weak acids with a strong base yield solutions which are highly alkaline. If one of the amide hydrogen atoms of sulphanilamide is replaced by an acetyl radical the compound *p*-aminobenzenesulphonacetamide is formed, which is known as sulphacetamide and was introduced under the proprietary name Albucid. It has been advocated for use in gonorrhœa, for which purpose it is less effective than sulphapyridine but rather strikingly free from toxic effects, owing probably to its low solubility and consequent poor absorption from the alimentary tract. Its sodium salt differs from the sodium salts of sulphathiazole and sulphapyridine in not yielding a highly alkaline solution. Sodium sulphacetamide is issued as Albucid soluble or Sulphacetamide soluble. It is employed intramuscularly and as a 30% solution for intravenous injection, and a 2·5% solution has been advocated for application to the eyes in the prophylaxis of bacterial infection following injury by vesicant war gases. Albucid and albucid soluble have been placed on the market in Canada under the names Sulamyd and Sulamyd soluble. Sulphacetamide differs from the acetyl derivative of sulphanilamide, into which the latter is partly converted in the body, since in sulphacetamide it is a hydrogen of the amide group which is replaced by the acetyl radical, whereas with acetyl sulphanilamide substitution takes place in the amino group. Analogous conjugation takes place with sulphapyridine, sulphathiazole, sulphadiazine and a number of other sulphonamide drugs. Unlike these compounds sulphacetamide appears to be partly broken down in the body to sulphanilamide.



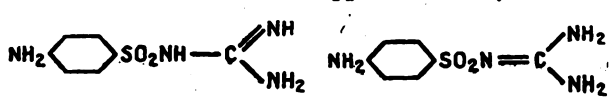
Sulphacetamide



Acetyl sulphanilamide

CHEMOTHERAPY INSIDE THE BOWEL

The absorption of a sulphonamide from the alimentary tract or from a wound chiefly depends on its solubility in water at body temperature. Thus the solubility and absorbability of sulphanilamide, sulphathiazole and sulphapyridine decrease in that order. Other factors, however, have an influence on degree and rate of absorption, and some compounds, much more soluble than sulphapyridine or sulphathiazole, have a low degree of gastro-intestinal absorption. The idea arose, therefore, of using a sulphonamide which is bacteriostatically active, fairly water-soluble and of low absorbability to combat infections which are largely confined to the alimentary canal. Marshall, Bratton, White and Litchfield (1940), who studied various compounds from this point of view, found that sodium sulphanilyl sulphanilate, N^1-(2-hydroxyethyl) sulphapyridine, N^1-diglycosulphapyridine and sulphanilylguanidine fulfilled the requirements of water-solubility and limited absorption from the intestine. Since sulphanilylguanidine appeared to be the most active of these compounds against a number of pathogens it was selected for pharmacological and therapeutic investigation. (It may be recalled that sodium sulphanilyl sulphanilate once achieved a short-lived but world-wide interest for a supposed activity in virus infections.) Sulphanilylguanidine is *p*-amino-N-guanylbenzenesulphonamide. Marshall and his colleagues suggest that the formulæ may both be considered correct for the compound as they are probably resonance isomers, easily transformed one into the other.



α-sulphanilylguanidine β-sulphanilylguanidine

Sulphaguanidine

The blood levels reached after the administration of sulphanilylguanidine are low as a consequence of its limited absorption, and the concentration in the gastro-intestinal tract is correspondingly high. It is suggested for trial in bacterial infections which are chiefly localised in the intestines, such as bacillary dysentery, cholera and the early stages of the enteric fevers, and for reducing the hazards of intestinal surgery. In acute bacillary dysentery it will have to be established that sulphanilylguanidine has advantages over sulphathiazole and sulphapyridine, those "veritable Excaliburs, with which dysentery apparently may be vanquished without fail"

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(Ravenel and Smith (1941)). Other sulphonamides have proved inactive on *Vibrion choleræ* at ordinary therapeutic concentrations but Marshall and others have found sulphanilylguanidine bactericidal in vitro in a concentration of 200 mg. per 100 c.cm., so that at the high levels reached in the gastro-intestinal tract it is possible that the administration of this compound may be of benefit in cholera. Its use in intestinal infections bears some analogy with the use of sulphonamides in infections of the urinary tract, where the concentration in the urine is, of course, enormously greater than in the blood and tissues.

Various sulphonamides have given unquestionable benefit in cases of ulcerative colitis, although the mechanism of the effect must necessarily remain obscure while the ætiology of this condition is unknown, and a few experiences in the use of sulphanilylguanidine in ulcerative colitis are encouraging. The drug is being known as sulphaguanidine, by analogy with sulphapyridine and sulphathiazole.

OTHER SULPHUR COMPOUNDS

Not all the sulphur compounds which are active antibacterial agents are sulphonamides; a number are sulphones, sulphoxides and sulphides. The sulphones (table II), which have been investigated experimentally as well as clinically, may be regarded as derivatives of 4 : 4′-diaminodiphenylsulphone. This substance has proved excessively toxic to mice but not to some other laboratory animals, and its toxicity probably precludes its clinical employment in man. McEwen, Pizer and Paterson (1941) have reported the rather unexpected finding that the compound is of relatively low toxicity for cattle, producing no toxic effects in therapeutic doses. The di-acetyl derivative of 4 : 4′-diaminodiphenylsulphone is of low toxicity and has been used in France for the treatment of gonorrhœa under the proprietary name Rodilone (1399 F.). The glucoside of 4 : 4′-diamino-diphenylsulphone has been studied for its activity in experimental bacterial and virus infections, and has been used clinically in the treatment of cerebrospinal fever, trachoma and lymphogranuloma inguinale. A compound known as Promin and described as the sodium salt of *p.p′*-diamino-diphenyl-sulphone-N,-N¹-didextrose sulphonate has been tried in artificially induced animal infections with various coccal and bacillary organisms, and used clinically by mouth and intravenously. This drug has been found to possess a retarding influence in experimental tuberculous infections of guineapigs apparently greater than that conferred by sulphonamides. At present, however, the effective chemotherapy of clinical tuberculous infections remains, with that of brucellosis, and the introduction of virucidal agents, probable achievements of the future. Despite the number of compounds in clinical use and the far greater number which have been studied experimentally, the tremendous strides made during the past few years constitute but the beginning, howbeit a highly successful one, of a new era in therapeutics.

REFERENCES

Finland, M., Strauss, S. and Peterson, O. L. (1941) *J. Amer. med. Ass.* **116**, 2641.
Long, P. H. (1941) *Bull. Johns Hopk. Hosp.* **68**, 350.
McEwen, A. D., Pizer, N. H. and Paterson, J. D. (1941) *Vet. Rec.* **53**, 429.
Marshall, E. K. Jun., Bratton, A. C., White, H. J. and Litchfield, J. T. Jun. (1940) *Bull. Johns Hopk. Hosp.* **67**, 163.
Mutch, N. (1941) *Brit. med. J.* **2**, 503.
Ravenel, S. F. and Smith, D. L. (1941) *Sth med. J.* **34**, 504.

Two footnotes from "The New Chemotherapy in Puerperal Infections," by G. F. Gibberd (*Guy's Hosp. Gaz.* Nov. 15, 1941, p. 290).

Note for those who think that curative medicine began with the discovery of sulphanilamide. N.B.—Prior to 1936 more than half of the patients suffering from hæmolytic streptococcal septicæmia in the puerperium did, in fact, recover.

Note for those who believe in the maxim "when in doubt give sulphanilamide." N.B.—One of the deaths in the 1936–39 group occurred in a patient whose infection was proved at post-mortem examination to have been confined entirely to the birth-canal. She died from agranulocytosis, not from hæmolytic streptococcal infection. She died from sulphanilamide. She died from treatment.

ACTIVE IMMUNISATION AGAINST TETANUS

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Ramon and Zoeller (1927) originally advocated the use of tetanus toxoid for the active immunisation of man against tetanus infection, and since then immunisation has been practised extensively in many countries, especially since the outbreak of the present war. The type of antigen to be used, the dose to be administered, the number of doses to be given and the interval between the doses have been the subject of much discussion and research. The methods by which active immunisation with toxoid is effected vary in different countries. On the Continent it is usual to administer three doses of toxoid at relatively short intervals, but Boyd (1938) showed that equally good results were obtained by giving two doses, each of 1 c.cm. at an interval of not less than 6 weeks, and this practice is followed in England, Canada and several other countries. Boyd pointed out that 6 weeks may not be the optimum interval and suggested that wider spacing of the doses might achieve better results. His main observations have been confirmed by many workers, and Marvell and Parish (1940) have shown that when the doses are injected at an interval greater than 6 weeks a larger quantity of antitoxin is produced. Maclean and Holt (1940) have recently shown that a good response follows the injection of two doses of toxoid given at an interval of 4 weeks, and that when the toxoid is combined with T.A.B. vaccine the response, as judged by the antitoxin formed, is even better. They consider that it is unnecessary to prolong the interval from 4 to 6 weeks when the toxoid is combined with T.A.B. vaccine. From the administrative point of view there appears to be an advantage in employing two rather than three doses and there is a large amount of evidence and experience in support of the efficacy of two widely spaced doses. On the other hand, the administration of three doses of toxoid, each of 1 c.cm., at an interval of 3 weeks between the doses is recommended for the immunisation of the military personnel of the United States of America (Bain 1941).

The procedure finally adopted will, no doubt, be based on the results of trials made in different ways. In July, 1940, active immunisation was offered to members of the staff of the National Institute for Medical Research, Hampstead. The method of immunisation was similar to that of Boyd, but the opportunity was taken (*a*) of investigating the effect of increasing the interval between the doses of toxoid to 9 weeks, (*b*) of determining the antitoxin content after a single injection of toxoid, as well as 4 and 10 months after the second injection, and (*c*) of investigating the effect of giving a third dose of toxoid 10 months after the second dose.

IMMUNISATION WITH TWO DOSES OF TOXOID

Two doses of tetanus toxoid each of 1 c.cm. were injected at an interval of 9 weeks into 81 subjects. The toxoid was given subcutaneously into the left arm and blood samples taken on three occasions: (1) immediately before the first injection, (2) immediately before the second injection, and (3) 17 weeks after the second injection. A small group of 16 persons were bled for a fourth time 10 months after the second injection. The sera were tested for tetanus antitoxin and the results are given in table I.

Of the 81 sera tested before inoculation, no sample showed as much as 0·01 international unit per c.cm. Nine weeks after the first injection, 22 of the 53 persons whose sera were tested still had less than 0·01 unit of antitoxin, while the remainder had developed more than 0·01 unit and almost a fifth of the persons more than 0·1 unit.

These results suggest that some persons had some basal immunity, a condition which may exist without evidence for it always being shown by the presence of detectable amounts of circulating antitoxin. Even if a person has not developed any basal immunity previously, this is very effectively provided by the first injection of toxoid, since after the second injection all the 70 persons tested had developed more than 0·01 unit, all but 2 showed more than 0·02 unit and as many as 59 more

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than 0·1 unit. It is to be noted that the values were recorded 17 weeks after the second injection, indicating that a high, and what is usually regarded as adequate, concentration of antitoxin had been maintained during this period. Moreover, the examination of the sera of 16 persons 10 months after the second injection showed that the level of the antitoxin had been substantially

TABLE I—TETANUS ANTITOXIN TITRES OF SERA FROM PERSONS BEFORE AND AFTER INOCULATION WITH TETANUS TOXOID

Blood sample taken	No. of samples	No. of sera showing titre (I.U. per c.cm.) of					
		less than 0·01	more than 0·01	more than 0·02	more than 0·1	more than 1	more than 5
Before first inoculation	81	81	0	0	0	0	0
9 weeks after first inoculation ..	53	22	31	22	10	0	0
17 weeks after second inoculation ..	70	0	70	68	59	19	0
10 months after second inoculation ..	16	0	16	16	14	0	0

maintained. Comparing the values in table II at 4 and 10 months after the second injection it is seen that, while those persons who had developed more than 1 unit of antitoxin showed some reduction in titre, in 9 of the cases the antitoxin content of the serum had remained unchanged.

It may be mentioned that 39 of the 81 subjects received, in the interval between the injections of the two doses of toxoid, two doses of T.A.B. vaccine, and 12 of these 39 also received an injection of influenza virus A vaccine within the same period. It cannot be assumed that these additional injections of other antigens were entirely without effect on the production of tetanus antitoxin, but the conclusion may safely be drawn that they did not interfere with the active immunisation against tetanus.

EFFECT OF A THIRD DOSE

It is the practice in certain countries, particularly in the armed forces, to give a further injection of tetanus toxoid a year after the first immunisation has been completed (Ramon 1939, Bain 1940). In this series, the opportunity occurred of investigating the effect of a third injection of toxoid on the antitoxin content of 16 of the persons who had been successfully immunised by two injections 10 months previously. The effect of the third injection was studied by determining the antitoxin content (1) immediately before, (2) 5 days, (3) 12 days and (4) 30 days after the third inoculation.

TABLE II—TETANUS ANTITOXIN TITRES OF SERA FROM 16 PERSONS BEFORE AND AFTER A THIRD INOCULATION OF TETANUS TOXOID

No. of serum	Antitoxin titre (I.U. per c.cm.)				
	After 2nd inoculation		After 3rd inoculation		
	4 months	10 months	5 days	12 days	30 days
1	0·02–0·1	0·02–0·1	0·02–0·1	2–5	2–5
27	0·1–1	0·1–1	2–5	10–20	10–20
31	0·02–0·1	0·02–0·1	0·1–1	2–5	2–5
35	0·1–1	0·1–1	1–2	10–20	5–10
40	1–2	0·1–1	2–5	20–50	20–50
44	1–2	0·1–1	2–5	20–50	20–50
48	1–2	0·1–1	5–10	20–50	20–50
52	1–2	0·1–1	2–5	20–50	20–50
58	0·1–1	0·1–1	1–2	10–20	5–10
59	1–2	0·1–1	10–20	20–50	20–50
64	0·1–1	0·1–1	5–10	20–50	20–50
65	0·1–1	0·1–1	2–5	20–50	10–20
86	0·1–1	0·1–1	2–5	10–20	5–10
88	1–2	0·1–1	2–5	10–20	10–20
93	1–2	0·1–1	2–5	20–50	10–20
108	0·1–1	0·1–1	1–2	5–10	2–5

The results of these tests are given in tables II and III, and the values found 6 months earlier (that is 4 months after the second injection) are also included.

The response to the third injection, given 10 months after the second injection, was well marked. In every case but one there was an increase in the antitoxin produced 5 days after the injection, and this increase continued to the 12th day, when 8 samples contained more than twenty units, 5 more than ten units, 1 more than five units and 2 more than two units. This large increase was maintained, unchanged in 10 cases, for 30 days.

DISCUSSION

The concentration of antitoxin in the circulating blood necessary to afford protection against tetanus is not precisely known. It may be that, as in the case of diphtheria, the actual concentration of antitoxin at the time of infection is not the sole factor in determining whether tetanus will develop when an actively immunised person is exposed to infection. The responsiveness of the immunising mechanism, established by the injection of toxoid, is considered by many authorities to be a factor of possibly equal importance. However, from the experience gained in the last war, there are good grounds for believing that a concentration of antitoxin of as little as 0·01 unit per c.cm. is adequate for preventing the onset of tetanus in wounded persons, and if this is so the results show, in agreement with those of others, that this concentration is produced and maintained for many months in persons who have received two spaced injections of toxoid.

The results also suggest a point which may be of practical administrative importance. Boyd showed that the interval between the two doses should not be less

TABLE III—SUMMARY OF FINDINGS IN TABLE II

Blood sample taken	No. of sera showing titre (I.U. per c.cm.) of						
	0·02–0·1	0·1–1	1–2	2–5	5–10	10–20	20–50
4 months after second inoculation ..	2	7	7	0	0	0	0
10 months after second inoculation ..	2	14	0	0	0	0	0
5 days after third inoculation ..	1	1	3	8	2	1	0
12 days after third inoculation ..	0	0	0	2	1	5	8
30 days after third inoculation ..	0	0	0	3	3	4	6

than 6 weeks, and these experiments have shown that the interval may be extended to 9 weeks. To extend the interval may sometimes be convenient; but in any case it is clear that the second dose may be deferred for several weeks at least without endangering the efficacy of the active immunisation.

A striking feature of a further injection of toxoid into actively immunised persons is the rapidity with which antitoxin is produced. There seems to be no record of the effect produced by absorption of the toxin in an actively immunised person infected with tetanus organisms; but, in so far as such a condition may be regarded as providing a secondary stimulus to the established immunising mechanism, these results suggest that the actively immunised person is provided, in his capacity to produce antitoxin rapidly in response to a specific stimulus, with an additional safeguard against the onset of tetanus. The administration of a further injection of toxoid a year or more after the first immunisation has much to recommend it. Although tetanus toxoid is remarkably certain in its action, there are, as judged by the antitoxin produced, some persons who respond better than others, and it is possible that in a larger series there might be some cases in which immunisation had apparently failed. In the case of tetanus there is, as yet, no simply applied test, like the Schick test in diphtheria, by which these failures can be discovered. If the procedure of giving a third injection after a year were generally applied those persons who did not become effectively immunised by the two earlier injections, as well as those in whom the antitoxin level had fallen, would be more certainly provided for, and the chance of an actively immunised person developing tetanus, which recent experience suggests to be very small (Perry 1940), would be still further reduced. The question whether the extra protection thus afforded would be offset by the additional trouble is one for administrative decision.

In view of the fact that actively immunised persons respond rapidly to a third injection by the production of antitoxin in large amounts, it has been suggested that persons wounded many months after immunisation need only be given toxoid and not antitoxin. Recent

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advocates of such a procedure are Kestermann and Vogt (1940), and the U.S. War Department, in recently issued instructions governing the administration of tetanus toxoid and antitoxin to military personnel (Bain 1941), state that wounded persons who have been immunised are to be given tetanus toxoid, and those who have not been immunised are to be given antitoxin. There is, however, not sufficient evidence to support an assumption that the same dramatic increase in antitoxin would necessarily occur in persons in whom infection by other organisms had become established, or, as pointed out by Marvell and Parish (1940), in seriously wounded persons suffering from shock.

SUMMARY

Examination of the sera of 81 persons (age 15–60 years), before active immunisation against tetanus, showed that none contained as much as 0·01 international unit of tetanus antitoxin per c.cm.

Nine weeks after the first injection of tetanus toxoid, examination of the sera of 53 persons showed that in 31 cases the antitoxin content was more than 0·01 unit, but that 22 still contained less than 0·01 unit.

Seventeen weeks after the second injection of toxoid, given nine weeks after the first, all the 70 persons examined had more than 0·01 unit, 68 more than 0·02 unit, 59 more than 0·1 unit and 19 more than 1 unit.

The antitoxin level was substantially maintained for ten months after the second injection.

The administration of a third dose of tetanus toxoid ten months after the second injection to 16 of these persons was followed by a large and rapid increase in the antitoxin content of the serum, and the high level was maintained substantially unchanged for a month.

REFERENCES

Bain, J. A. (1941) *J. Amer. med. Ass.* **116**, 2857.
Boyd, J. S. K. (1938) *J. R. Army med. Cps*, **70**, 289.
Kestermann, E. and Vogt, K. E. (1940) *Klin. Wschr.* **19**, 1129.
Maclean, I. H. and Holt, L. B. (1940) *Lancet*, **2**, 581.
Marvell, D. M. and Parish, H. J. (1940) *Brit. med. J.* **2**, 891.
Perry, H. M. (1940) *Ibid*, **2**, 364.
Ramon, G. (1939) *Pr. méd.* **47**, 877.
— and Zoeller, C. (1927) *Ann. Inst. Pasteur*, **41**, 803.

PLACENTAL BLOOD IN THE TREATMENT OF AMENORRHŒA

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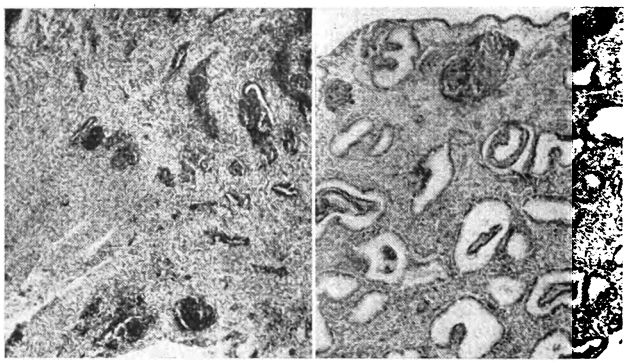
THE treatment of amenorrhœa and sterility with various gonadotropic hormones has been unsatisfactory up to now, owing to the fact that these hormones, though showing some effect on the ovaries of rodents, have none on the ovaries of women and monkeys. Recently positive results have been reported from the use of the serum of pregnant mares, but it is too early to give a conclusive verdict on its value.

It seems possible that gonadotropic preparations might fail because they contain an incomplete hormonal complex: they lack an activator which is present in the blood. This would explain the better results obtained with the serum of pregnant mares. I therefore decided to investigate the effect of placental blood. Vaginal bleeding and lactation in the newborn seem to indicate that placental blood is rich in hormones, though no exact laboratory estimate has yet been made of its hormonal content. If correctly obtained it causes no graver reactions than ordinary blood, and by using plasma I eliminated the danger of hæmolytic crises.

In order to determine whether placental blood really was active I gave injections of it to 34 amenorrhœic women, with the result that 18 menstruated within 5–35 days after the end of the course of treatment; in most of them menstruation began between the 15th and the 20th days. A further 3 patients menstruated on or after the 35th day. Of those I was able to follow up, 5 menstruated once only, 8 twice or more; the others were not traced. In the light of subsequent experience it seems likely that those who failed to menstruate may have received too little blood. At first I gave only three or four injections of blood. A few patients menstruated after receiving small quantities—a few drops—but others required larger amounts.

In 11 cases the effect of placental blood, or plasma, on the uterine mucosa was determined by histological examination before and after treatment.

Method.—Before treatment I dilated the cervix up to Hegar 5–6, curetted lightly with the finest curette, and examined the endometrium histologically. Treatment by placental blood or plasma was begun immediately afterwards. Each patient received 5–6 injections of 150–200 c.cm.—in some cases all plasma, in others at least half plasma—given intravenously. Treatment was ambulatory and the patients received a total of 800–1000 c.cm. Sometimes they developed fever, but as a rule there was no reaction of this kind. After every injection the patient was given Pyramidon, 0·3 g., which I think prevents the milder reactions. The intervals between injections depended on how the patient felt, but I usually gave one every second day.



(*a*) (*b*)

Patient aged 29 years with amenorrhœa for 10 months. (*a*) Endometrium before treatment, completely atrophic. (*b*) Endometrium 14 days after treatment, showing normal appearance.

Curettage before treatment produced more or less atrophic endometrium. After 3 injections of placental blood of 150 c.cm. each, and 3 injections of plasma in similar dosage, 5 patients showed a complete change in the endometrial structure from atrophy to the proliferative or secretory state. All 5 menstruated shortly after treatment, though they had been amenorrhœic for periods ranging from 5 months to 2 years. Another patient menstruated 20 days after the beginning of treatment but the mucosa remained atrophic. The remaining 5 patients did not react at all; one had not menstruated for 15 years and examination of the uterine mucosa showed tuberculous endometritis. I had removed the one remaining ovary of another woman a year before. She had developed menopausal symptoms which were not affected by placental blood, and no change was seen in the uterine mucosa. This case suggests that the action of placental blood does not depend on its folliculin content but on gonadotropic substances present in it. The remaining 3 unresponsive cases had not menstruated for periods ranging from 2 to 5 years, and were suffering from climacterium præcox. In all cases which menstruated or showed changes in the endometrium the size of the uterine cavity increased from 1 to 2·5 cm.

SUMMARY

A series of 34 patients who had had amenorrhœa for periods ranging from 4 months to 15 years received placental blood or plasma intravenously; 18 of them menstruated within 5–35 days of the end of treatment.

Of 11 patients showing atrophy of the endometrium before treatment, 6 had a normal endometrium after 5-6 intravenous injections of 150–200 c.cm. of placental blood or plasma.

These results indicate that placental blood is rich in gonadotropic substances.

". . . If colds and their coughs hadn't made a habit of coming and going in precisely the same way regardless of what we did for them, man would long since have coughed himself off the face of the earth."—THEODORE G. KLUMPP, *Science*, Aug. 1, 1941, p. 99.

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MENINGOCOCCAL INFECTION

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SINCE the identification of the meningococcus by Weichselbaum in 1887, the clinical concept of meningococcal infection has been dominated by its most serious manifestation—meningitis. As early as 1899 Gwyn recovered meningococci from the blood of patients suffering from meningococcal meningitis, and in 1902 Salomon described meningococcal septicæmia without meningitis. Although of recent years reports (Applebaum 1937, Heinle 1939, Stott and Copeman 1940) of similar cases of meningococcal blood-stream infection have become more numerous, the disease is still regarded by most physicians as a clinical rarity.

A series of 26 patients suffering from meningococcal infection were admitted to No. 15 Canadian General Hospital in the period July, 1940, to June, 1941, inclusive. Of these 11 did not have meningitis on admission (though one, case 10, subsequently developed it) but had meningococcal septicæmia. We thus had an opportunity to observe the course of infection in these patients, and to compare their histories with those of meningitic cases seen in the same body of troops at the same time. The cases were sporadic, occurring in every month of the year. They came from Canadian troops stationed in England, but were not otherwise related to each other or to other recognised cases of meningococcal infection. For presentation the series is divided into two groups: an ameningitic and a meningitic.

THE AMENINGITIC GROUP

The 11 patients without meningitis came to hospital under a variety of diagnoses, including influenza, arthritis, erythema nodosum and rheumatism. The diagnosis in 10 of the 11 cases was proven by growing *Neisseria meningitidis* from the patient's blood (table I). The clinical manifestations, however, were such as to render a diagnosis possible in most cases.

The onset was sufficiently definite to enable the patient to fix its date with fair precision. Thereafter the course was marked by striking remissions, varying greatly in length, and by even more striking relapses. The early symptoms of fatigue, malaise, feverishness, chilliness, occasional true rigor, aching pains in the limbs and back, and sometimes moderate intermittent headache, were those which characterise the onset of many acute infections. Other symptoms and signs, of more particular diagnostic value were superimposed on this general picture of infection. These were localised muscle pain, localised joint pain and skin lesions.

The localised muscle pain, present in 10 of the 11 patients, differed sharply from the aching pain common in acute infection. Its onset was abrupt, associated with fever and general symptoms of infection, and often with localised joint pains and with crops of the skin lesions described below. While in some it was little more than stiffness, it was of sufficient severity to form the chief complaint of 5 of the patients. It was increased by movement. Its site could be localised accurately by the patient and was tender. The calf muscles were most commonly affected, less often those of the back, thighs and arms.

Localised joint pain, aggravated by movement, occurred in 8 of the patients and was a chief complaint in 3. Its onset, too, was abrupt and associated with symptoms of infection and frequently with a crop of skin lesions. In 3 cases the pain was associated with redness, swelling and increased heat; in 1 of these there was increased joint fluid. These 3 patients came to hospital with a diagnosis of arthritis. In some patients the joint pain seemed to be related to a tender skin lesion overlying the joint, while in others it was not associated with any demonstrable abnormality. The pain usually disappeared in a few days, only to recur in the same or in other joints. One or more joints were involved at one time, more commonly the large joints, but sometimes the small joints of the hands and feet.

Skin lesions appeared at some time during their illness in all the patients except one, case 8, whose illness was only of two days' duration before treatment. The spots appeared suddenly, in crops of a few or dozens, at any place on the body surface, but most commonly on the limbs and trunk. Their occurrence coincided with or closely followed the onset or recurrence of fever and general symptoms of infection. The patient's attention was drawn to them, not only by their appearance, but also because many were painful and tender. The spots varied in colour, size, palpability and tenderness. Most of them were clearly demarcated bright pink circular areas, 5–35 mm. in diameter, the smaller sizes predominating. They were regular in outline; some had a central dark purplish red spot or streak, and a few of the larger spots were darker and resembled somewhat the lesions of erythema nodosum. On pressure the pink zones faded, but the purplish red centres persisted, indicating hæmorrhage. Most of the larger lesions, and all those with hæmorrhagic centres, were palpable. Some were elevated slightly above the skin surface, others were deeper. Many of the lesions, particularly the larger ones, were moderately painful and tender. Often such spots marked the site of localised muscle or joint pain. Subsequent examination revealed changes in the lesions. After a few hours, or next day, some which had appeared at first as red macules had developed hæmorrhagic centres and become palpable. In two to four days the redness faded and the tenderness disappeared. Slight staining from the central hæmorrhage, and sometimes a small lump, persisted for a week or more. The lesions were in no way similar to the blotchy purpuric eruption commonly observed in cases of cerebrospinal fever and occurring in some of the meningitic cases in this series (table II).

The appearance of a crop, or crops, of the skin lesions, associated with fever, general symptoms of infection and localised muscle and joint pain, usually accompanied by leucocytosis, provided a clinical picture which strongly suggested meningococcal septicæmia.

Enlargement of the spleen was not observed in any of the cases. The only evidence of endocarditis found was that of a pre-existing aortic insufficiency due to rheumatic fever in childhood in case 8. No change in the character of the murmur was observed during his stay in hospital, and the course of the disease in this patient did not differ from the others. Under treatment he made a complete recovery from the meningococcal infection.

The cerebrospinal fluid was examined in 6 of the 11 cases, although none presented any clinical evidence of meningitis. In all the fluid was normal in cell and protein content and was sterile on culture.

In this group, 9 patients were treated with sulphapyridine during the ameningitic phase; 8 made a complete recovery after the administration of 34 g. of the drug in seven days, 12 g. being given in the first twenty-four hours. In case 3 the diagnosis was not made, and consequently treatment was not instituted until the disease had been present for three months. Although the infection was then cured by chemotherapy and did not recur, this soldier was left with residual joint pain, which necessitated lowering his medical category. Case 1 was not given chemotherapy and case 10 was not given sulphapyridine until meningitis developed. The case-histories of these 2 patients well illustrate features presented by most of the patients in the group. They also show certain features of special interest, and serve to stress the importance of recognition and treatment of meningococcal septicæmia.

CASE 1.—A gunner, aged 39. He had been well until May 23, when he had developed malaise, chilliness, feverishness and aching pain in the back and limbs. He was evacuated to a military hospital. Temperature was 103° F.; leucocyte count 17,000 with 77% neutrophils. Meningitis was suspected, but the C.S.F. was normal and sterile on culture. On May 25 he developed pain in the knees, ankles and shoulders. He was transferred to an E.M.S. hospital and treated for rheumatism during the next five weeks. During this time he noted repeated crops of spots in the skin many of them tender, appearing in association with recrudescence of fever, muscle pain and joint pain. On July 6 he was admitted to this hospital. At that time the right knee and ankle were

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painful and swollen; movement was restricted by pain. Many red, palpable, tender spots about the size of a sixpence were scattered over the limbs and trunk. Some of these had hæmorrhagic centres. From July 6 to 28 he had repeated remissions and relapses. Thereafter he remained free of symptoms and was sent to a convalescent depot on Aug. 12. A diagnosis of arthritis was recorded.

In retrospect it appears certain that this patient suffered from meningococcal septicæmia, and that the diagnosis was missed both by ourselves and at the two other hospitals. The two blood samples taken while in this hospital did not show any growth, but such evidence is quite inadequate (see table I) to exclude the diagnosis

TABLE I—THE AMENINGITIC GROUP

Case	Admitted	Duration (days)	Muscle pain	Joint pain	Skin lesions	Leucocyte count	No. of blood samples	Positive
1	July 6, 1940	45	+	+	+	17,000	2	0
3	July 31	90	+	+	+	18,000	2	1
6	Aug. 30	17	+	−	+	18,000	1	1
8	Oct. 25	2	−	−	−	23,000	1	1
10	Nov. 23	12	+	+	+	11,000	2	1
12	Jan. 1, 1941	60	+	+	+	9000	4	2
15	Feb. 18	15	+	+	+	14,000	10	4
17	Feb. 25	27	+	+	+	10,000	4	1
20	March 15	7	+	+	+	22,000	6	4
21	March 24	28	+	+	+	17,000	21	2
26	June 14	33	+	+	+	10,000	14	12

of meningococcal septicæmia in a patient presenting the above clinical findings. This patient was still free from recurrence about three months later, having made, apparently, a spontaneous recovery, but he was invalided home to Canada on account of residual joint pain.

CASE 10.—A sapper, aged 19. He had been in good health until Nov. 16, 1940, when he became suddenly ill with fatigue, malaise, feverishness, chilliness, headache and localised pain in the right calf. He felt better for the next two days, during which he remained on duty. On Nov. 19 he became more ill; temperature 104° F.; a crop of red tender spots appeared in the skin; he was evacuated to a dressing station where he again had a short remission. On the 21st he had recurrence of fever and more spots; and on the 23rd, when there was fever again and more spots, he was transferred to this hospital. Temperature 103° F.; many skin lesions present, some tender and many palpable with hæmorrhagic centres. Leucocyte count 11,000 with 88% neutrophils. Next day his temperature was normal and the spots fading. On the 25th he had a rigor; temperature rose to 104·6° F. He complained of malaise, moderate headache and general aching pain with more severe and localised pain in the left elbow. There were many new skin lesions, one of which, very tender, was situated over the left elbow. Lumbar puncture revealed clear fluid under normal pressure; 3 lymphocytes per c.mm.; Pandy test negative; fluid sterile. A blood sample taken on this day yielded *N. meningitidis* group I on Nov. 28. By this time, however, the patient was afebrile and symptom-free. No specific treatment was instituted. He felt well and was up and about the ward until Dec. 16 (18 days intermission). On that day he again had a rigor and his temperature rose to 103° F. He complained of malaise and aching pains in limbs and back. A new crop of spots appeared. He developed headache, which rapidly became severe, slight neck pain and stiffness. Blood taken at this time was sterile. C.S.F.: 100 neutrophils per c.mm.; protein 40 mg. per 100 c.cm.; no organisms seen on direct smear, but culture yielded *N. meningitidis* group I. Under treatment with sulphapyridine the patient made a complete recovery, although the C.S.F. cell-count rose to 1200 during the first 12 hours of treatment.

This case was thus observed first in the ameningitic phase of the disease. Then, after a period of freedom from symptoms, the infection again became manifest, but this time meningitis developed. The case serves to stress the close association between the ameningitic type of meningococcal infection and the meningitic type, a relationship that is further demonstrated on consideration of the meningitic group.

THE MENINGITIC GROUP

The clinical histories of the patients comprising this group indicated the presence of infection for periods varying from a few hours to several weeks before the onset of meningitis. While it is impossible to identify precisely the beginning of meningeal inflammation, there are grounds for assuming that it approximates in time to the onset of severe persistent headache. Although such headache was the chief complaint of all the patients who were conscious at the time of admission, in no case was it the first symptom of the illness. That headache of this type may accompany very early meningeal involvement is apparent from case 10, where lumbar puncture was done within four hours of the onset of persistent headache, the Pandy test was negative, the C.S.F. cell-count was only 100 neutrophils, and culture yielded *N. meningitidis* group I. The premeningitic period shown in table II refers therefore to the time between the onset of symptoms and signs of infection, and the onset of severe persistent headache. This premeningitic period lasted from one to seven weeks in 5 cases, from one to six days in 4 cases, and from three to sixteen hours in 6 cases. In one case the information was not recorded. The early symptoms were, as in the ameningitic group, those commonly characteristic of the onset of acute infection. However, in an appreciable number of the patients there were additional features which indicated a more specific diagnosis.

In 8 of the 9 cases in which the premeningitic period lasted longer than one day, the signs and symptoms occurring in this phase of the disease were clearly defined. These 8 patients gave a history of localised joint pain, associated with localised muscle pain in 6, and with skin lesions of the type described above in 5. Further, all 5 patients in whom this period exceeded a week gave a history of remissions and relapses. In short, the illness

TABLE II—THE MENINGITIC GROUP

Case	Admitted	Duration of ameningitic phase	Muscle pain	Joint pain	Skin lesions	Purpura	Leucocyte count	Blood culture	C.S.F. Cells	C.S.F. Film	C.S.F. Culture	Duration of meningitis before treatment (hr.)
2	1940 July 17	?	?	?	−	−	..	..	1200	−	..	12
4	Sept. 11	3 hr.	?	?	−	−	31,000	+	3600	+	+	12
5	Sept. 29	16 hr.	−	+	−	+	23,000	+	40,000	+	+	36
7	Oct. 24	15 days	+	+	−	−	14,000	−	2500	−	+	10
9	Nov. 7	4 days	−	−	−	−	17,000	−	20,000	+	+	24
10	Nov. 23	30 days	+	+	+	−	12,000	−	100	−	+	5
11	Dec. 10	6 days	?	+	−	−	18,000	−	12,000	−	+	24
13	1941 Jan. 2	30 hr.	−	+	−	−	19,000	−	6500	+	+	36
14	Jan. 13	6 hr.	−	−	−	+	17,000	−	16,000	−	−	17
16	Feb. 21	12 hr.	−	−	+	+	26,000	−	37,000	+	+	12
18	Feb. 27	3 hr.	−	−	+	−	24,000	+	9000	+	+	48
19	Mar. 11	11 days	+	+	+	−	14,000	−	6500	−	−	48
22	April 2	12 hr.	−	+	−	+	20,000	+	250	−	+	8
23	April 8	2 days	+	+	+	−	22,000	−	9000	+	+	12
24	April 30	14 days	+	+	+	−	16,000	−	9000	+	+	10
25	May 7	49 days	+	+	+	−	10,000	−	1200	−	+	24

of these patients before the onset of meningitis was essentially similar to those of the patients in the ameningitic group. In 3 of the 6 cases in which the premeningitic period was less than one day the symptoms were essentially similar to those of the ameningitic group—muscle pain, joint or skin lesions either singly or in combination. In 2 cases the information was not

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obtained. In case 14 it is known that such signs or symptoms were not present although the patient was ill with general symptoms of infection for six hours before the appearance of any headache. The clinical records of some of the patients are even more enlightening than the tabulated data. For example, in case 5 the soldier first reported to his regimental medical officer because of pain in the right ankle and knee, and was evacuated to a casualty clearing station with a diagnosis of rheumatism. In case 22 the patient complained of sudden severe pain in the right shoulder, approximating in time to the onset of the headache. It should be pointed out here that the patients suffering from meningitis seldom gave this history at the time of admission to hospital. The more distressing symptoms of meningitis tended to obliterate the memory of the milder symptoms of the earlier illness. However, with the disappearance, under treatment, of the headache, irritability and mental confusion the patients recalled their preceding illness vividly.

It is apparent from table II that the cases varied greatly in severity from mild to fulminating. Meningococci were recovered from the cerebrospinal fluid in 13 of the 16 cases. In 1 the fluid was not cultured, in 2 it failed to yield any growth. These 3 were clinically typical cases of cerebrospinal fever. The intervals between the onset of meningitis and the beginning of treatment were from five to seventy-two hours.

In addition to the usual symptomatic treatment, sulphapyridine was used as in the ameningitic cases, but was continued for ten days and a total of 40 g. was given. In all but the mildest cases the dosage by mouth was augmented by the intravenous administration of 2–4 g. of sodium sulphapyridine at the onset of treatment. Unconsciousness or persistent severe vomiting made necessary the continuation of the intravenous therapy in cases 5, 14 and 22. Blood levels of 4·2–12 mg. of free sulphapyridine per 100 c.cm. and C.S.F. levels of 2·7–10 mg. per 100 c.cm. were obtained during the first forty-eight hours.

Of the 16 patients, 12 made a rapid and complete recovery, all symptoms disappearing in three to five days. In these the C.S.F. pressure, cell-count and protein content fell rapidly, but in some several weeks passed before the cell-count and protein were entirely normal. Deafness, present in 3 patients on admission, cleared entirely in 2; the third was left with slight nerve deafness not sufficient to lower his medical category. This patient had mild intermittent headache which persisted for ten weeks. One patient continued to complain of slight headache and neck pain for eight weeks; in this case, although the cell-count and protein content returned rapidly to normal, the C.S.F. pressure continued high; the end-result is not yet known. Cases 5 and 22 died.

Case 5, a fulminating infection with severe meningitis, was comatose on admission and the cell-count in the spinal fluid was 40,000; *N. meningitidis* was recovered from both blood and C.S.F. The patient showed some improvement and subsequent samples of blood and C.S.F. failed to yield growth. In spite of this temporary improvement, the coma deepened, breathing became rapid, stertorous and irregular, pulse and temperature rose. Clinically death occurred from respiratory failure. At necropsy there was much œdema of brain and spinal cord with flattening of the cerebral convolutions, and the brain was compressed downwards with herniation of the hippocampal unci through the tentorial notch, and of the cerebellar tonsils through the foramen magnum. This cerebellar pressure cone was well developed. The pial blood-vessels were intensely injected, but practically no meningeal exudate was present. Death was apparently due to medullary compression consequent on increased intracranial pressure.

Case 22 was desperately ill on admission, with extensive purpura and showed only 250 cells in the C.S.F.; this, however, yielded meningococci, as did the blood. With treatment there was temporary clinical improvement and both blood and C.S.F. became sterile. The early improvement was followed by acute left heart-failure, manifested by acute pulmonary œdema and rising pulse-rate. He died thirty-six hours after admission. At necropsy, although the pial vessels were extremely injected and the brain somewhat œdematous, there was a complete absence of gross meningeal exudate, and microscopically several sections had to be studied before evidence of scanty cellular exudate was seen. Generalised purpuric hæmorrhages and an extremely flabby heart, the chambers of which were much dilated, were indications of the severe toxæmia.

BACTERIOLOGY

Blood samples were planted in glucose broth. C.S.F. was drawn directly at the bedside into small vials containing sloped Löffler's medium. It is evident (tables I and II) that recovery of the organism from the blood in non-fulminating cases was largely a matter of chance. For example, twenty-one samples of blood from case 21 yielded only two positive cultures. Growth was demonstrable in some cultures in twenty-four hours, but in others longer periods of incubation up to ten days were required. This variation was found in cultures obtained at different times from the same patient. For instance, one blood sample from case 26 yielded growth in twenty-four hours; another required seven days before growth was demonstrable by film or sub-culture.

All the strains isolated gave typical fermentation of glucose and of maltose. They were tested for agglutination with specific antisera by the late Dr. W. M. Scott and Dr. Marion Watson, from whose reports the following summary is made:

Of the 10 strains isolated from the ameningitic group cases 6 and 26 were group I; cases 12 and 20 were group I, type III; case 10 was group I, uncommon type; case 15 was group I, aberrant type; case 17 was probably group II; case 8 was agglutinated by group I and group II antisera; cases 3 and 31 were not agglutinated by either. So far as the agglutinative type was concerned, therefore, the strains exhibited considerable variety. Of 10 of the strains isolated from the meningitis cases, 5 (cases 16, 22, 23, 24 and 25) were group I, type III; 3 (cases 9, 11 and 18) were group II; 1 (case 10) was group I, uncommon type; 1 (case 13) group I, aberrant type. Strains isolated from cases 5 and 7 were not sent to Dr. Scott, but tests in the laboratory of this hospital showed them to be group I. One strain, case 4, was not tested. It is to be noted that meningitic cases from whom the same agglutinative type was isolated showed widely different premeningitic periods. For instance, cases 16 and 22, from whom group I, type III, strains were obtained, each had a premeningitic period of twelve hours, while cases 24 and 25, from whom the similar group I, type III, strains were obtained, had premeningitic periods of two weeks and seven weeks respectively.

DISCUSSION

The fact that the number of cases of ameningitic meningococcal septicæmia approached the number of meningitic cases in this series strongly supports Heinle's statement that "meningococcic septicæmia can no longer be regarded as a rare disease." The character of the skin lesions, with their sudden occurrence in crops, associated with symptoms of infection, fever and leucocytosis in the presence of proven bacteræmia, provides good evidence that they are due to localisation of organisms in the skin. The isolation by Kennedy (1926) of gram-negative diplococci from what appears to have been a similar lesion is strong confirmation of this view. So, too, the muscle and joint pain, abrupt in onset and often occurring at the same time as the skin lesions in the proven bacteræmic cases, seems to be due to similar localisation of bacteria in deeper tissues. The recovery by Still (1898) of a gram-negative diplococcus from a tendon sheath—the site, apparently, of a similar lesion—is corroborative evidence.

The occurrence of skin lesions, localised muscle pain or localised joint pain during the premeningitic phase of meningitic cases is strong, if not conclusive, evidence that the premeningitic illness was really due to meningococcal septicæmia. More of the ameningitic cases might have developed meningitis, like case 10, had the infection not been interrupted before that incident. The course of the infection as exhibited by the patients in this series as a whole appears to have been the development of bacteræmia followed by localisation of bacteria in the skin, skeletal tissues and sometimes the central nervous system. If the nervous system was not involved early, remissions and relapses occurred and chronic meningococcal septicæmia developed.

In some of the meningitic cases with longer premeningitic periods the diagnosis might well have been made and

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effectual treatment given before the onset of meningitis. This would have resulted in an increase in the number of ameningitic cases in the series, and—what would have had more significance—a corresponding reduction in the number of cases of meningitis treated in this hospital. In others with a shorter premeningitic phase appreciation of the significance of such signs and symptoms might have suggested the character of the infection and have led to closer supervision and earlier treatment. It is still important that cases of meningococcal meningitis should be treated at the earliest possible moment; further reduction in mortality seems to depend on such early treatment.

There is no reason to suppose that a peculiar susceptibility or resistance of the host was operative in this series. Some of the patients had recently arrived in this country, others had been here for a year or more. There is nothing to suggest that the troops from which they came differed in any way from their fellows, or that the environment in which they lived affected their reaction to the infection. The fact that organisms of several different agglutinative types were recovered from both the ameningitic and meningitic groups goes far to exclude the possibility that a special characteristic of the organism was important in determining the course of the infection. It appears unlikely, therefore, that the findings here reported are peculiar to this group.

SUMMARY

A series of 26 cases of meningococcal infection, occurring in Canadian soldiers stationed in England and admitted to a Canadian general hospital between July, 1940, and June, 1941, is reported.

Of these patients, 11 did not have meningitis on admission, but suffered from meningococcal septicæmia; only one of these subsequently developed meningitis. The clinical findings in this group include the presence of characteristic skin lesions and of localised muscle pain and joint pain.

Most of the 16 meningitic patients had a premeningitic phase in which the signs and symptoms were identical with those of the patients in the ameningitic group, and were no doubt also due to meningococcal septicæmia.

REFERENCES

Applebaum, E. (1937) *Amer. J. med. Sci.* **193**, 96.
Gwyn, N. B. (1899) *Johns Hopk. Hosp. Bull.* **10**, 112.
Heinle, R. W. (1939) *Arch. intern. Med.* **63**, 575.
Kennedy, J. C. (1926) *J. R. Army med. Cps*, **47**, 6.
Salomon, H. (1902) *Berl. klin. Wschr.* **39**, 1045, quoted by Heinle.
Still, G. F. (1898) *J. Path. Bact.* **5**, 147.
Stott, A. W. and Copeman, W. S. C. (1940) *Lancet*, **1**, 1116.

PARADOXICAL CEREBRAL EMBOLISM

WITH RECOVERY

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PARADOXICAL embolism, by definition, is the passage of an embolus, usually originating in a thrombus of a systemic vein, direct from the right to the left side of the heart, without traversing the pulmonary vessels, to produce a systemic arterial embolism. The condition was first described by Cohnheim (1876), and Zahn (1881) demonstrated an embolus in situ astride a patent foramen ovale. Von Recklinghausen (cited by Thompson and Evans 1929–30) suggested the term "paradoxical," rather than "crossed" embolus which had previously been used. From an analysis of 13,234 consecutive autopsies, Thompson and Evans found that paradoxical embolism was responsible for death in 4% of all cases of cerebral embolism, and mentioned that diagnosis during life can never be quite certain. The following is a case of paradoxical cerebral embolism in which the patient recovered.

A gunner, aged 26, admitted to hospital on March 7, 1941, complaining of pain and swelling behind left knee of 24 hours' duration. Had had varicose veins for some years but they had never given trouble. Tender and swollen varicose vein behind left knee; diagnosis of phlebitis made and treatment instituted. On March 11 thrombosis had spread up great saphenous vein for several inches. On evening of the 21st patient was lying on his bed, having been allowed up for a day or two, and when spoken to was found to be unconscious. Soon regained consciousness, but speech slurred, both pupils widely dilated and generalised tremor of limbs. Next morning complete flaccid left-sided hemiplegia, fine nystagmus to left, paralysis of left external rectus oculi, left palate and left lower face. Incontinence urine, which lasted 24 hours. On 23rd paralysis had become spastic, with increased deep reflexes and absent abdominal reflexes on left and left extensor-plantar response. No alteration of sensation or any other abnormal sign in central nervous system. Lumbar puncture produced normal fluid under normal tension. No enlargement of heart or cardiac murmurs; blood-pressure 125/85. Chest showed no evidence of pulmonary embolism. Temperature and respirations normal. X ray of chest at later date normal. Urine normal.

By March 27 movement returning to left foot and knee, and by end of April patient was moving about ward with help. On May 24 examination prior to a medical board revealed: slight left-sided lower facial weakness, weakness of convergence of left eye with bilateral nystagmus on looking to left; some weakness of left hand and arm and very slight weakness of left leg and foot; left abdominal reflexes diminished, with accentuation of deep reflexes on left and left extensor-plantar response. All these signs were less a month later and patient was then walking about freely.

DISCUSSION

The embolism had presumably occurred in the right middle cerebral artery, in the region of the internal capsule—the commonest site for such a lesion though Hartfall (1931) recorded a case of paradoxical embolism in the basilar artery.

There are two routes by which an embolus could pass directly to the left from the right side of the heart: through a patent foramen ovale or through an opening in the interventricular septum. Pressure is higher in the left than in the right auricle, and the foramen ovale is usually guarded, on the left side of the interauricular septum, by a flap-valve. The head of pressure on the left side is sufficient to keep the flap closed and so to ensure the competence of the valve. From the mechanical point of view an alteration of pressure between the two sides of the heart is required to destroy the competence of the valvular foramen ovale; thus a rise in the right auricular pressure and a fall in that of the left auricle would cause the valve to open. Haggart and Walker (1923) found that a partial occlusion of the pulmonary artery in cats caused a rise of pressure in the right side of the heart, accompanied by a fall of pressure in the left side. This mechanism has been supposed to operate when an embolus lodges in the pulmonary artery, and Thompson and Evans have advanced three criteria for the production of paradoxical embolism:

1. At least a third of the diameter of the pulmonary artery must be occluded by an embolus: less than this is not sufficient to alter the pressures materially, while occlusion of more than a half results in immediate death.
2. A second embolus must shortly follow the first and appear in the right auricle.
3. The second embolus must be small enough to pass through the foramen ovale, now rendered patent through alteration in intracardiac pressure.

In the case here described there was no clinical evidence of a pulmonary embolus; physical examination of the lungs was normal, respiration-rate unaltered, temperature normal, there was no cough and no sputum, and a radiogram of the chest, when the patient was well enough to have one taken, was normal. Of Thompson and Evans's 5 cases of paradoxical embolism, only 2 showed evidence of pulmonary embolus, and it seems that though this occurrence is possibly a mechanical necessity in the cases of valvular foramen ovale, it is not essential to paradoxical embolism. Two other possibilities exist. First, a widely patent foramen ovale could allow the passage of an embolus without previous pressure changes. In 1100 consecutive autopsy records examined by Thompson and Evans at the London Hospital, patency of the foramen ovale was found in 35% (29% up to 2 cm. and 6% up to 7 cm.). In a further 24 cases dying from pulmonary embolism, and found at autopsy to have a patent foramen ovale, there was no evidence of paradoxical embolism. Sir Thomas Lewis (1934) stated that

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patency (which he distinguished from mere persistence by the size of the aperture) of the foramen ovale was very rare; neither condition, he said, gave rise to signs. It seems possible that a widely open foramen, giving rise to no physical signs, could transmit an embolus in the absence of pressure changes.

A second theory, put forward as a possible alternative, is that the embolus arrives in the right auricle, coils up over the tricuspid valve and blocks it sufficiently to cause the momentary rise in pressure necessary to force open the valve guarding the patent foramen ovale. The embolus is then swirled through the foramen to the left heart and so to the systemic circulation; the tricuspid valve acts normally again, the foramen ovale flap-valve closes and the pressures are restored to normal. I do not suggest that these alternatives are mutually exclusive, but that either may be in operation, according to the state and size of the foramen ovale.

Diagnosis can never be certain, but Thompson and Evans stated that "If a patient, the subject of venous thrombosis, develops cerebral embolism . . . and if in such a patient there is no clinical evidence of any cardiovascular disease present, then it may be justifiable to assume that the embolus is of the paradoxical variety." In my case there were no clinical or radiological signs of cardiovascular abnormality. The circulation-rate was estimated with the object of demonstrating, if possible, the existence of a patent foramen ovale. The arm-to-tongue method was employed, using Suprachol. The time was 12 sec., the normal for young men being 12–16 sec. Although the result was inconclusive it was at least at the rapid extreme of normal range.

The differential diagnosis lay between paradoxical embolism and thrombophlebitis migrans. Ryle (1936) says that thrombophlebitis migrans is never due to varicosity, that it is essentially migratory, affecting multiple small lengths of superficial veins, and is accompanied by fever; hæmoptysis, pleurisy and hæmaturia may also occur. Paradoxical embolus, therefore, was confidently diagnosed in this case. Recovery was virtually complete. I can find no record of a previous case of paradoxical cerebral embolism which recovered, with the exception of case 1 in Thompson and Evans's series, which they described as unique.

SUMMARY

A case of paradoxical cerebral embolism is described, in a young man who recovered completely.

There was no evidence of previous pulmonary embolus.

The embolus may have reached the systemic circulation either by passing directly through a widely patent foramen ovale; or (if the patent foramen was of the valvular type) by causing temporary obstruction to the tricuspid valve so that the pressure in the right auricle rose above that in the left auricle, and the embolus was swept through the foramen.

I wish to thank Dr. L. C. Martin, who had charge of the case, and Dr. Leslie Cole, who estimated the circulation-rate.

REFERENCES

Cohnheim, J. (1887) *Allgem. Path.* Berlin, **1**, 134.

Haggart, G. E. and Walker, A. M. (1923) *Arch. Surg.*, Chicago, **6**, 764.

Hartfall, S. (1931) *Lancet*, **1**, 700.

Lewis, T. (1934) Diseases of the Heart, London, p. 264.

Ryle, J. A. (1936) Natural History of Disease, London, p. 331.

Thompson, T. and Evans, W. (1929–30) *Quart. J. Med.* **23**, 135.

Zahn, F. W. (1881) *Rev. méd. Suisse rom.* **1**, 227.

For the treatment of scabies MESSRS. BOOTS have issued a solution of benzyl benzoate called Scobenzol. This contains benzyl benzoate 25%, soft soap 25%, and isopropyl alcohol 50%.

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ISOAGGLUTININ CHANGES
AFTER TRANSFUSION OF INCOMPATIBLE BLOOD AND SERUM

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LITTLE attention has so far been paid to serological changes in the recipient after the transfusion of incompatible blood. There are only 3 recorded cases in which such changes have been noted.

Rø (1937) reports the case of a patient of group O who received 500 c.cm. of group A blood. Although preliminary cross-matching showed no agglutination of the donor's cells by the recipient's serum, when the test was repeated with serum obtained two days after the transfusion agglutination occurred up to a dilution of 1/20. At the end of five weeks the agglutinating power of the recipient's serum for A cells had increased further and agglutination occurred in a dilution of 1/200. Four weeks later the titre had fallen to 70 (the titre being expressed as the reciprocal of the greatest dilution in which agglutination is noted). Rø suggests that the recipient's serum contained only a hæmolysin for A cells before the transfusion and that the introduction of A cells stimulated the production of an agglutinin. In any case, it seems clear that the agglutinin titre rose rapidly during the period following the transfusion.

Wiener (1941) has published details of 2 cases, both of which had been referred to previously (Wiener 1939). The first patient, of group O, received 500 c.cm. of group B blood. Six hours after the transfusion, which was followed by a rigor and hæmoglobinuria but no serious sequelæ, it was observed that whereas the titre of the anti-A isoagglutinin was 32, that of the anti-B agglutinin was as low as 1. Further estimations were made at short intervals, and it was found that while the titre of the anti-A isoagglutinin remained constant, that of the anti-B agglutinin rose steadily, reaching a peak, at the thirteenth day, of 512. The same figure was found when the serum was re-titrated on the twenty-fourth day after the transfusion. The other case was less closely observed. Six days after the transfusion of incompatible blood (of group AB, the patient belonging to group A), it was found that the titre of the anti-B agglutinin was 128; and eight days later 256. It is concluded that these changes represent an absorption of isoagglutinin by the injected agglutinogen, followed by an immune response to the foreign agglutinogen.

In only one of these 3 cases were frequent titrations of the recipient's serum carried out, and in that observations were only extended up to the twenty-fourth day after transfusion. It may therefore be of interest to record the following case in which, after the transfusion of incompatible blood, the isoagglutinins in the serum of the recipient were repeatedly titrated and the changes were followed for some months. The results obtained are in substantial agreement with those of Rø and Wiener, but changes in the "other agglutinin" were also found,—i.e., after the transfusion of group B blood to a person of group O not only was the titre of the anti-B agglutinin affected but also that of the anti-A agglutinin. These changes were traced to the use of a serum of group different from that of the patient.

CASE-RECORD

A married woman, aged 32, was admitted to hospital at 1 A.M. on Sept. 16, 1940, half an hour after receiving injuries caused by a high-explosive bomb. The injuries were mainly due to falling masonry and included fractures of both legs. She was found to be "shocked" and was treated with warmth, morphia and the transfusion of blood and plasma. After receiving 540 c.cm. of citrated stored blood 3 days old (equal to 360 c.cm. whole blood) and 250 c.cm. of pooled plasma, she improved sufficiently for the doctors in charge to leave her for the night. Next morning it came to our notice that the bottle of blood that had been given was not of group O, as had been assumed, but of group B. The patient was visited by us for the first time at 10 A.M., some eight hours after the transfusion had been given. She was then in a very poor condition. Her lips and nails were ashen grey and her skin very cold. No pulse was palpable at either wrist or over either brachial artery and no sounds could be heard at the latter site on auscultation. We were told that although no untoward

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symptoms had occurred during the transfusion, no great improvement had followed; the patient's condition had deteriorated since, particularly during the last three hours.

After a preliminary intravenous injection of 150 c.cm. of 3% sodium-citrate, 1500 c.cm. of pooled citrated plasma, 100 c.cm. of four-times normal reconstituted serum and 2 pints of citrated blood (group O) were transfused. The clinical condition improved steadily throughout the transfusion and four hours from the beginning of this treatment, when all but the last 500 c.cm. of blood had been given, the blood-pressure was 116/80 mm. Hg and the extremities had become quite warm.

A quarter of an hour after the preliminary intravenous injection of alkali the patient was catheterised and 95 c.cm. of blood-stained urine was withdrawn. The urine was slightly acid to litmus and had probably all been formed many hours previously, since the blood-pressure was still unrecordable at this time. Very many red cells and some leucocytes but no casts were found in the centrifuged deposit of this specimen; the supernatant fluid only contained 0·7% hæmoglobin (Haldane). The patient was catheterised again at 12.45 P.M., when 170 c.cm. of urine was withdrawn; this was neutral to litmus. On centrifuging, it was apparent that the red colour was due almost entirely to red blood-cells, the supernatant fluid containing only a trace of hæmoglobin as measured by the benzidine test.

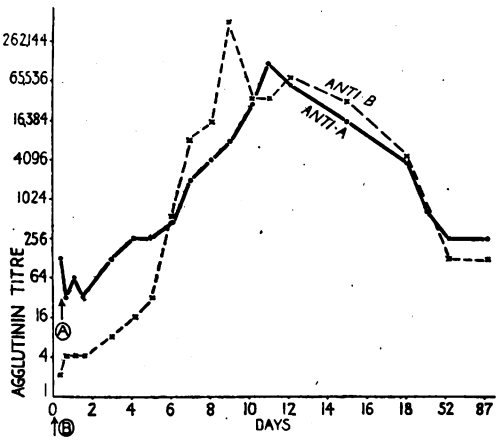

FIG. 1—Changes in titre of serum isoagglutinins after transfusion of (1) group B blood (at B), (2) concentrated serum of group A (at A). Recipient was group O.

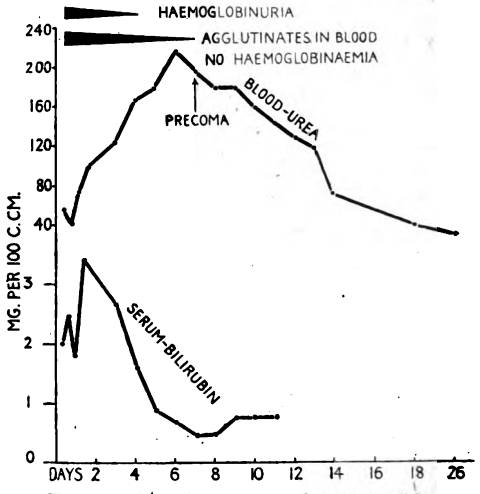

FIG. 2—Findings after incompatible transfusion.

A venous sample was first obtained eight hours after the initial transfusion and the findings were: hæmoglobin 66%, serum-bilirubin 2 mg. per 100 c.cm., serum-proteins 4·3%, blood-urea 55 mg. per 100 c.cm.; blood group O. Microscopical examination of a suspension showed fair-sized agglutinates which were not increased by the addition of anti-A or anti-B serum. A sample of serum was obtained at the same time and titrated with A and B cells from the donors normally used by this laboratory. The technique employed is that recommended by Taylor and Prior (1938); the end-point is read microscopically and clumps of 3–5 cells are taken as evidence of agglutination. The titre of the anti-A agglutinin was 128 and of the anti-B only 2 (see fig. 1). At 12.45 P.M., after the patient had received 1500 c.cm. citrated plasma and 100 c.cm. of four-times normal serum, a second venous sample was taken and examined. The hæmoglobin had fallen to 42% while the plasma-proteins had risen to 4·7%. The serum-bilirubin was 2·5 mg. per 100 c.cm., and the blood-urea 45 mg. per 100 c.cm. (see fig. 2). Microscopical examination showed rather bigger agglutinates than in the first smear. The titre of the anti-A agglutinin had fallen to 32, while that of the anti-B had risen slightly to 4.

After the further transfusion of two bottles of blood and 150 c.cm. of 3% citrate, another venous sample was obtained (5.20 P.M.). The hæmoglobin was now 49%, serum-bilirubin 1·8 mg. per 100 c.cm., serum-proteins 4·9% and blood-urea 75 mg. per 100 c.cm. The titre of the anti-A agglutinin was 64 and of the anti-B again 4.

From the time when the patient was first seen by us, an attempt was made to measure the fluid intake and the urinary output. During the first twenty-four hours 3000 c.cm. of lemon squash containing 35 g. of potassium citrate was given (as advised by Bushby and others 1940), and 2000 c.cm. of the same mixture was given during the subsequent twenty-four hours. A rather incomplete record of the fluid intake and urinary output was kept, but it was clear that there was a large negative water balance up to the eighth day, although the urinary output never fell to really low levels.

The patient was visited again on the morning of the 17th, some thirty hours after the incompatible transfusion. Her clinical condition was surprisingly good. She was lucid and not in pain. Her skin looked faintly yellow. She had been catheterised at 5 A.M., and 70 c.cm. of urine had been withdrawn. This specimen contained albumin and was neutral to litmus. The sediment contained many red blood-cells but no casts. The supernatant fluid contained only a trace of hæmoglobin. On this occasion the temperature was 99° F., pulse-rate 120 and blood-pressure 116/80 mm. Hg. The blood still contained agglutinates; the blood-urea had risen to 101 mg. per 100 c.cm., the serum-bilirubin to 3·2 mg. per 100 c.cm. and the serum-proteins to 5·1%. The titre of the anti-A isoagglutinin was 32; that of the anti-B agglutinin still 4.

On the 18th the patient was better, although the blood-pressure was 136/102 mm. Hg and the blood-urea 126 mg. per 100 c.cm. The serum-bilirubin had fallen a little (2·7 mg. per 100 c.cm.). A smear of the blood showed only a few small agglutinates. The titre of the anti-B isoagglutinin had risen to 8 and that of the anti-A isoagglutinin to 128. The urine was alkaline to litmus, and the sediment contained a few red blood-cells and pus and epithelial cells, but once more no casts. During the past twenty-four hours she had passed only 10–20 oz. of urine, compared with a fluid intake of 80 oz.

Until the 22nd (the 7th day) the patient appeared to improve steadily, despite a consistently raised diastolic pressure and a steadily mounting blood-urea. During this period agglutinates were found in the blood, but they became progressively smaller and actually were last seen on the 23rd. From the 18th onwards the titre of both anti-A and anti-B isoagglutinins rose steadily, and, as will be seen from fig. 1, reached very great heights during the period Sept. 24–27 (9th to 12th days). Between Sept. 23 and Oct. 11, when the titrations were read, it was noted that hæmolysis occurred in the first or first and second dilutions with both A and B cells.

On Sept. 23 the patient was much worse. She was very drowsy, her respirations were deep and there was a heavy brown fur on the tongue; she was considered to be in pre-coma. The blood-pressure was 150/100 mm. Hg. On this and the subsequent two days the patient was made to sweat profusely by giving Dover's powder and aspirin and heating her with electric blankets, &c. Whether as the result of the sweating or not, she was much better on the 24th, and the urinary output increased from this day onwards. On the 25th the improvement was maintained and the blood-pressure had fallen to 136/80 mm. Hg. From this time onwards, recovery was uneventful from the medical point of view.

During the ten days after the transfusion, two attempts were made to perform renal-function tests. Neither was wholly satisfactory, but both revealed an unequivocal degree of impairment of renal function. On Sept. 21 the clearance was 18% of normal and on the 26th, 30% (van Slyke). On the 26th the urine contained a trace of albumin and a few epithelial and granular casts. The urea-clearance test was repeated on Oct. 4 and was then 50% of normal.

Further examinations of the serum were made during the following months. A slow reduction in the titre of both isoagglutinins was found. From the abnormally high levels reached two weeks after the transfusion the titres gradually fell towards normal.

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DISCUSSION

The changes in the titre of the anti-B isoagglutinin will be seen to be of the same nature as those described by Wiener; they consist of an initial reduction, presumably due to an absorption by the transfused group B blood, followed by a big increase, presumably representing an immune response. The first specimen in our case was obtained eight hours after the transfusion, and thus may be compared with the first specimen in Wiener's case, obtained after 6 hours. The titre of the anti-B isoagglutinin was found, as in Wiener's case, to be extremely low. Thereafter there was a steady rise in titre, and the peak was reached on about the eighth day (not before the thirteenth day in Wiener's case). The extent of the rise, however, seems to have been much greater in this case even when allowance is made for individual differences in the reading of serum titrations. Thus in our case agglutination with B cells could be detected in a dilution of 1/500,000 compared with the figure of 1/512 given by Wiener. Wiener (1941) has recently stated that with the technique that he employs the average isoagglutinin titre is only 16–32. In this laboratory, using the technique referred to above, rather higher figures are obtained (average 64–128). This difference in the normal end-point is insufficient to account for the much greater rise in titre observed in our case. The slow return to a normal level is in accord with Rø's observations.

The changes in the anti-A isoagglutinin—a small initial fall followed by a large rise—at first seemed to be a non-specific response to the injection of the group B blood. Then, however, a more convincing explanation suggested itself. At the time when these observations were made, Aubert, Boorman and Dodd, of this laboratory, were engaged in confirming and extending the work of Schiff (1924); an account of their work is in the press. Schiff first demonstrated the presence of the group-specific substances in soluble form in the serum and postulated an equilibrium between the concentration of agglutinogen in erythrocytes and serum. With this fact in mind, it seemed likely that the rise in the titre of the anti-A agglutinin might have been due to the injection of group A substance in either the plasma or serum that had been transfused in the course of treatment. The plasma, however, was taken from a pool of different groups. It has been demonstrated that this plasma is virtually free of agglutinins, and it may therefore be safely assumed that it only contains traces of the corresponding agglutinogens. The serum, on the other hand, was found to be of group A and had not been pooled. Soon after we had made these observations, Aubert and his colleagues demonstrated that it was possible to produce an immune response in man to the agglutinogen contained in serum of groups A, B or AB. This latter work was carried out with Seitz-filtered human serum. Since the serum injected in our case was a four-times concentrated solution, reconstituted from dried serum * which had been Seitz-filtered before drying, we tried the effect of injecting similarly prepared serum of group A into two people of group O. The results are given in fig. 3. As will be seen, after a small fall, the titre of the anti-A agglutinin rose considerably. Thus a satisfactory explanation for the changes in the titre of the anti-A isoagglutinin in the patient who also received group B blood was reached.

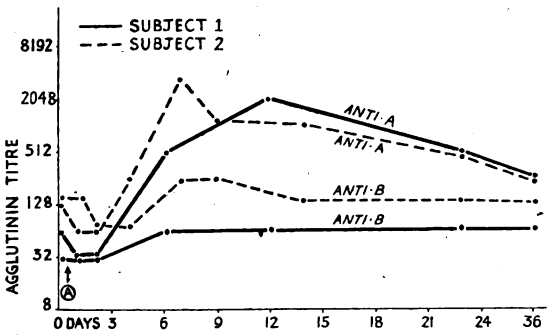

FIG. 3—Control experiments. Changes in titre of anti-A agglutinins in two patients of group O after the transfusion of 100 c.cm. of four-times normal concentrated human serum of group A, reconstituted from the dried product. The serum had been Seitz-filtered before being dried. Transfusions given at A.

It will be noted that the rise in titre of the anti-A isoagglutinin was also very great and considerably exceeds that of the two "controls." It also exceeds that produced by Aubert in any of his experiments (personal communication). The fact that the rise in titre of both agglutinins was so large suggests the possibility of some non-specific stimulation in each case. Aubert has noted slight changes in the anti-A agglutinin after the injection of the B agglutinogen in B serum and vice versa. Further, it is well known that the naturally occurring anti-A or anti-B agglutinin in the serum of some rabbits is often much increased after the injection of OM or ON cells to produce anti-M or anti-N sera. Davidsohn (1938) has pointed out that the isoagglutinin titre of human serum is increased after the induction of serum sickness. In view of these observations it seems reasonable to suppose that some reciprocal non-specific stimulation may have occurred between the one antibody response and the other.

Before this explanation for the changes in titre of the anti-A isoagglutinin had suggested itself, the recipient's serum was tested for the presence of anti-M and N agglutinin, in case their production had been stimulated. No anti-M or anti-N antibodies were found.

As has been mentioned, agglutinates were detected in the recipient's blood-stream up to the seventh day after transfusion. Only until the day after the transfusion, however, were these agglutinates fair-sized. From this day until the seventh only a few small agglutinates persisted, but even on the seventh day a few clumps of five cells were seen. No clumps could be detected on the eighth day or later. Burnham (1930) found some donor cells remaining in the recipient's blood-stream on the third day, but none on the sixth day, after the transfusion of incompatible blood. Wiener and others (1941) in another case found that all but a few of the incompatible cells had been eliminated two days after transfusion.

The rise in serum-bilirubin is a typical finding and is too great to be attributable to the transfusion of stored blood per se. In our experience the transfusion of blood previously stored for three days with a citrate-saline-glucose solution normally leads to only small transient increases in the serum-bilirubin of the recipient.

From the clinical aspect the case adds nothing to existing knowledge of the syndrome of renal insufficiency after the transfusion of incompatible blood, particularly because of the complicating factor of severe injury. As Grant and Reeve (1941) have recently pointed out, there is as yet no precise knowledge of the circumstances in which renal function is disturbed in air-raid casualties.

The passage of many red cells in the urine may have been due to a contusion of the left kidney, since that side of the body was very bruised.

It is interesting to note that there was no immediate reaction to the transfusion—540 c.cm. of citrated stored blood (containing 360 c.cm. whole blood) was transfused in approximately thirty minutes, but no untoward effects were noted. The temperature, however, was not recorded. Others have noted that the transfusion of incompatible blood is not necessarily accompanied by any obvious immediate reaction (Grove and Crum 1930, Wiener and others 1941).

The progress to uræmia and then to recovery was very similar to that of some of the cases described by Bordley (1931), and the final outcome was in close accord with his observation that no patient receiving less than 350 c.cm. of incompatible blood died.

Knowledge of alterations in the titre of the affected agglutinin, after the transfusion of incompatible blood, has important practical applications. First, if after a hæmolytic reaction, cross-matching is repeated with serum obtained from the recipient within a day or two of transfusion, a false negative result may be obtained owing to the temporary suppression of the agglutinin concerned. Secondly, when the donor cannot be traced, serial titrations of the recipient's serum will decide whether or not the blood given contained an incompatible agglutinogen. Thirdly, cross-matching repeated on the

* From the Medical Research Council's serum-drying unit at Cambridge.

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tenth to fourteenth day after transfusion is most likely to detect the presence of a weak or atypical incompatible agglutinin, since the immune response will be maximal at this time.

SUMMARY

After the transfusion of group B blood to a woman of group O, changes in the titre of the anti-B isoagglutinin were observed. There was an initial reduction, followed by a rapid increase, and then a slow fall to the original level. These findings confirm previous observations.

Similar changes in the titre of the anti-A isoagglutinin were also found. These changes almost certainly represent a response to the injection of the A agglutinogen contained, in soluble form, in the group A serum transfused in the course of treatment.

We are grateful to the medical officers of the hospital concerned for allowing us access to their patient and to Dr. O. M. Solandt, then director of this depot, for helpful criticism.

REFERENCES

Aubert, E. F., Boorman, K. E. and Dodd, B. E. Personal communication.
Bordley, J. (1931) *Arch. intern. Med.* **47**, 288.
Burnham, L. (1930) *Ibid*, **46**, 502.
Bushby, S. R. M., Hart, E. W., Kekwick, A. and Whitby, L. E. H. (1940) *Lancet*, **1**, 355.
Davidsohn, I. (1938) *Amer. J. clin. Path.* **8**, 179.
Grant, R. T. and Reeve, E. B. (1941) *Brit. med. J.* **2**, 329.
Grove, E. F. and Crum, M. J. (1930) *J. Lab. clin. Med.* **16**, 259.
Rs, J. (1937) *Acta. chir. scand.* **80**, 283.
Schiff, F. (1924) *Klin. Wschr.* **3**, 16.
Taylor, G. L. and Prior, A. M. (1938) *Ann. Eugen.* **8**, 343.
Wiener, A. S. (1939) Blood Groups and Blood Transfusion, Springfield, Ill.
— (1941) *J. Immunol.* **41**, 2, 181.
— Hyman, M. A., Oremland, B. H. and Samwick, A. A. (1941) *Amer. J. clin. Path.* **11**, 2.

STAB WOUNDS OF THE HEART AND PERICARDIUM

FOUR CASES WITH THREE RECOVERIES

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IT has been our practice to explore and do an open thoracotomy on all consenting cases of penetrating wounds of the chest admitted to our beds at the New Somerset and later the Groote Schuur Hospitals. Experiences in a series of 17 cases since the procedure became standardised were detailed in a previous paper (Schrire 1940). In this report 4 cases of penetrating wounds of the pericardium and 2 of perforation of the right ventricle are described.

WOUND OF THE SURFACE OF LEFT VENTRICLE

CASE 1.—A coloured man, aged 36, was admitted to the New Somerset Hospital on March 26, 1936, with a stab wound of the chest received in a drunken brawl an hour before admission. The knife had entered the left 6th interspace 1 in. outside the nipple line and the wound was bleeding profusely; the patient was cold and breathless. Morphine, gr. ¼, was given immediately and the wound was temporarily plugged with dry gauze. After an hour he had recovered sufficiently from his shock to be operated on. Anæsthesia was induced with chloroform and ether and continued with ether. The wound was excised and the interspace opened up; to increase the exposure, the costochondral cartilages of the 5th and 6th ribs were divided and a rib-retractor was inserted. The lung had escaped injury and a wound, ¾ in. long, was seen in the pericardium over the left auricle; no blood issued from it. The wound was enlarged and it was then possible to see that there was a superficial slit on the surface of the left wall of the left ventricle which had divided the superficial fibres of the myocardium; there was no bleeding from this wound and it was left untouched. Two interrupted sutures were then inserted to close the pericardium and the chest was closed. No drain was used. The patient stood the operation well. His condition was satisfactory till the next day when his pulse-rate began to rise and he died 24 hours after the injury. Autopsy showed that death was due to hæmorrhage from the 6th intercostal artery which had bled into the pleura.

PENETRATING WOUND OF RIGHT VENTRICLE

CASE 2.—A coloured man, aged 46, was admitted to the New Somerset Hospital on Feb. 27, 1937, having been stabbed with a kitchen knife half an hour before admission. On examination in the casualty department a wound ½ in. long and transverse in direction, was seen 1 in. inside and 1½ in. above the left nipple. He was much shocked. The pulse-rate was 96. A probe inserted into the wound could not be made to enter the thorax. The pulse remained steady for 2 hours; during this time occasional profuse jets of dark blood issued from the wound. Physical examination showed a complete absence of breath sounds and dullness of the left side of the chest. No heart sounds could be heard on the left side: but distant sounds were found behind the lower half of the sternum. With 1% procaine as a local anæsthetic an incision 4 in. long was made in the line of the 5th rib and the small skin wound was excised. The 5th costal cartilage was found to be severed in an oblique direction and 3 in. of it and of the 5th rib were resected. A hole in the pleura about 1½ in. long was found and enlarged. The left lung was seen to be partially collapsed but every now and then the patient would take a deeper breath, or cough, and the lung would be forced into the wound. A slit on the anterior surface of the pericardium was now seen from which dark blood welled up and overflowed into the pleura which contained about a pint. The flow from the pericardium was intermittent, occurring about three times a minute. The wound in the pericardium was enlarged and a hole was found in the right ventricle ½ in. to the right of the anterior interventricular vessels. From the hole in the heart, which was ¾ in. long and transverse in direction, dark blood issued in large jets synchronous with the heart beats. My left forefinger, placed in this wound, controlled the bleeding. I decided to enlarge the opening in the chest wall, and, as the patient would not keep still and the hæmorrhage was under control, open ether was given. Using the right hand, I prolonged the skin vertically downwards for 3 in. along the left border of the sternum and divided the 6th left costal cartilage. The rib-spreader was now introduced and a good view of the pericardium and heart was obtained. A curved needle with no. 1 chromic catgut was now used to put in the first suture through the middle of the cardiac wound and this was tied fairly loosely so as to approximate, but not tear through, the wall of the ventricle. Using this suture as a guy, five more interrupted sutures were inserted and the bleeding was stopped. The pericardium was then closed with three interrupted catgut sutures. The lung was found to have escaped injury and the pleura and chest musculature were rapidly approximated after the neurovascular bundles had been transfixed and ligated. The skin was then closed. No drainage was employed. Once the suture of the heart itself was completed the ether was discontinued and the closure was done while the patient was recovering. The patient left the table in good condition with a pulse-rate of 110.

Convalescence was long and trying. The superficial part of the wound became infected and was treated with hot fomentations; a pleural effusion, which fortunately remained sterile, developed in the left pleura and required frequent tapping and one small exploratory operation with negative findings. Several blood-transfusions helped to maintain strength. The patient was discharged to a convalescent home 3 months after admission. He was seen a year later in good condition and was in full work.

WOUND OF PERICARDIUM AND PLEURA; CARDIAC TAMPONADE

CASE 3.—A coloured man, aged 21, was admitted drunk to the Groote Schuur Hospital on Oct. 3, 1938. He had been stabbed in the chest an hour before, and was cold, clammy and shocked; the casualty-officer noticed that the pulse was small and rapid and the respirations shallow. The wound, 1 in. from the right border of the sternum in the 5th interspace, did not bleed to any unusual extent. Under observation, the pulse became imperceptible and his general condition steadily deteriorated while the apex-beat was neither visible nor palpable. Cardiac tamponade was diagnosed and the patient was operated on an hour after admission. He was wildly excited and quite uncoöperative, and anæsthesia was induced with C_2E_3 and maintained with nitrous oxide, oxygen and ether. The chest was opened by a vertical incision which ran parallel and 1 in. lateral to the right border of the sternum, and the original wound was excised. Three costal cartilages were resected to improve the exposure. There was some blood in the pleural space, but owing to dense old adhesions the lung had not retracted and it was necessary to separate the adhesions by means of sharp dissection in order to get a working space; the internal mammary artery was

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divided between ligatures. There was no wound in the lung and the pericardium was now inspected—it was tense and blue—cardiac pulsations were only barely palpable on its surface and no wound could be found. An exploring needle was inserted and blood was withdrawn. The pericardium was accordingly opened and about ½ pint of blood escaped with a rush; the anæsthetist immediately reported a considerable improvement in the quality of the pulse and the heart could be seen beating freely. In spite of careful search no bleeding point could be seen on the surface of the heart or on the pericardial walls and it was decided to close the chest. The pericardium, incised as it was for about 3 in., was left wide open and the pleura was drained. The chest was now closed. One pint of blood was given on the patient's return to the ward.

The next day the man's condition was fairly good, but his mental state was unsatisfactory. About 10 oz. of blood-stained fluid had drained from the tube when the patient pulled it out and it could not be reintroduced. Repeated aspirations were done and a fortnight later an empyema was drained under local anæsthesia. By the end of October the patient was in a poor way; he had air-hunger, his respirations were laboured, the temperature was swinging and the pulse-rate was 140. Radiography showed the pericardial shadow to be greatly enlarged in all diameters, and on screening restricted cardiac pulsations were seen. A diagnosis of suppurative pericarditis was made. On Oct. 29, 1938, pericardiotomy was done under local anæsthesia. An incision 3 in. long and parallel with the left lower border of the chest was made, beginning at the chondroxiphoid junction and extending downwards and laterally. The 7th left costal cartilage was removed and the perichondrium deep to it cut away. This exposed the internal mammary artery which was divided between ligatures. Dissection was carried out in the chondroxiphoid angle and the surface of the pericardium, tense and pale, was found. Owing to the position of the incision there was no risk of damage to the left pleura. The pericardium was opened and a profuse flow of thick pus came out in jets synchronous with the heart beat. A finger was inserted into the pericardium and "bread-and-butter" adhesions, such as can be found in old empyemata, were felt and separated; more pus escaped. A drainage-tube was placed down to the pericardium and the patient was nursed sitting upright to facilitate drainage; 2 pints of blood were given immediately. Saline irrigations carried out twice daily allowed a profuse discharge of pus to escape. The temperature settled and the general condition improved. A pure streptococcal culture was obtained from the pus and sulphanilamide was given to control the infection. The patient was discharged to a convalescent home on Dec. 14, 1938. On Nov. 8, 1939, he returned for incision of an abscess at the site of the original wound. This cleared up without any trouble. He had been on full work for the last 8 months as a packer in a furniture factory and had noticed no ill effects as a result of his pericarditis.

THORACO-ABDOMINAL WOUND PENETRATING THE RIGHT VENTRICLE

CASE 4.—A coloured man, aged 25, was admitted on Nov. 12, 1938, to the Groote Schuur Hospital suffering from a stab wound in the left side of the chest, through which 3 in. of omentum projected. It was thus evidently a thoraco-abdominal injury. The patient was in good condition and operation was undertaken 2 hours after admission. Under open ether anæsthesia, an incision in the 7th interspace about 10 in. long with its centre surrounding and excising the original stab, which was in the mid-axillary line, was made. The chest was opened and the neurovascular bundle beneath the 7th rib was tied off after it had been under-run. A rib-spreader was introduced and the hole in the diaphragm identified. This was about 3 in. long; the spleen could be seen just under the hole. A moderate amount of blood in the pleural cavity was mopped up and the lung was pulled down, examined, and being uninjured was released and allowed to retract. At this point it was noticed that the pleura had once more filled with blood, and this was traced to a wound about ½ in. long on the posterior surface of the pericardium. The pericardium was then seen to be tightly distended with blood. Since it was now obvious that a cardiac wound was present I decided to close the diaphragm and not to explore the abdomen further. The omentum was returned to the abdomen and the diaphragm was sutured with two layers of continuous no. 2 chromic catgut. The left phrenic nerve was crushed as it passed over the pericardium to paralyse the diaphragm and facilitate subsequent manipulations. The rib-spreader was now removed and another incision, at right angles to the first, was made extending for about 4 in. upwards and inwards; this gave an inverted T-shaped incision. The 7th, 6th and 5th ribs were cut in the line of the supplementary incision, and their neurovascular bundles divided between ligatures; it was now possible by means of strong traction to elevate a sort of flap consisting of the chest wall, upwards and outwards. The rib-spreader was reintroduced. The pericardium was now opened and about ½ pint of blood escaped. The heart was delivered into the wound, but owing to its movements it was impossible to reach its posterior surface. A no. 2 chromic suture was passed through the fibro-fatty tissue at the apex and this acting as a tractor, the heart was lifted out and its posterior surface exposed. A wound about ½ in. long was found on the posterior surface of the right ventricle, close to the posterior interventricular vessels and about a third of the distance between the auriculoventricular sulcus and the apex. Two sutures of no. 1 chromic were inserted and these controlled the bleeding. The traction suture was now cut, the heart returned to its place and the pericardium was left wide open. A stab wound was made in the 8th space posteriorly and a self-retaining catheter was inserted. The chest wound was then closed and the patient returned to bed.

Convalescence was uneventful. The tube was removed in 48 hours and the patient left the hospital at his own request on Dec. 2, 1938. When seen 2 months later he was fit and at work again as a labourer.

DISCUSSION

These cases show variable symptomatology. Thus, 3 were shocked on admission; the fourth, who had the thoraco-abdominal wound, was in good condition. It will be noticed that case 2, though apparently shocked on arrival at hospital, had a pulse-rate of 96 which had risen to 110 on leaving the operating table. Only in cases 1 and 2 was there any profuse external bleeding, which in case 2 came in occasional jets of dark blood; this patient had a penetrating wound of the right ventricle. In the other case of right ventricular penetration (case 4) external bleeding was not noteworthy. In case 2 the heart was saved from pressure by leakage into the pleura. Cardiac tamponade, characterised by a rapid pulse of decreasing volume with absence of an apex-beat, occurred in only one patient (case 3) in spite of the fact that the pericardium communicated with the pleural cavity; here, old adhesions seem to have prevented leakage of blood into pleura.

Every case was explored along the track of the wound. The original skin incision was excised and the wounded interspace widely opened; a view of the damage was then obtained, regardless of chest-wall structures. Ribs were sectioned with shears, costal cartilages were divided with a knife and—except in case 1—interspaces were cut across between two ligatures which transfixed and tied the neurovascular bundles. The importance of this last procedure is measured by the fact that the only death in the series (case 1) was due to a leaking intercostal vessel.

In order to suture the penetrating heart-wounds in cases 2 and 4 it was necessary to steady the heart. In case 2, a finger was placed in the hole in the heart (Elkin's manœuvre 1936). In case 4, where the stab pierced the phrenic surface of the right ventricle, a suture was passed through the fibro-fatty tissue at the apex and used as a tractor to lift the heart (Beck 1926). The chest was closed quickly by bringing the ribs together with pericostal sutures. Intercostal muscles were disregarded but parietal layers were carefully closed.

Separate drainage of the pericardium invites ascending infection. It is better to leave the pericardium opening widely into the pleural cavity and to drain the pleura with a large self-retaining catheter passed into the chest through a cannula; the end of the catheter dips under water. It is possible to get a wound of the heart without penetration of the pleura (Elkin and Phillips 1931), but even in such cases it would usually be necessary to open the left pleura in order to get sufficient exposure; so that pleural drainage would entail little extra structural damage. If case 2 had been drained, the patient might have been saved many tappings and an exploratory thoracotomy. In case 3 the adhesions appear to have prevented satisfactory pericardiopleural drainage.

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Search of the literature has shown only 10 cases of thoraco-abdomino-cardiac wounds with 2 recoveries, both recorded by Pool (1912). Case 4 is a third instance of recovery after this rare lesion.

I am indebted to my chief, Mr. W. L. Gordon, F.R.C.S., for permission to use his beds and for moral support, and to Dr. G. A. Elliot, Dr. Arthur Landau and Prof. J. F. Brock for assisting in the after-treatment of the cases.

REFERENCES

Beck, C. S. (1926) *Arch. Surg. Chicago*, **13**, 205.
Elkin, D. C. (1936) *J. thorac. Surg.* **5**, 590.
— and Phillips, H. S. (1931) *Ibid*, **1**, 113.
Pool, E. H. (1912) *Ann. Surg.* **55**, 485.
Schrire, T. (1940) *Brit. med. J.* **2**, 662.

Reviews of Books

Lymphatics, Lymph and Lymphoid Tissue

Their Physiological and Clinical Significance. C. K. DRINKER, M.D., D.Sc., professor of physiology, school of public health, Harvard University; and J. M. YOFFEY, M.D., F.R.C.S., senior lecturer in anatomy, University College of South Wales and Monmouthshire. Cambridge, Mass: Harvard University Press. Pp. 406. $4.00.

THIS book, appearing at a time when the behaviour of the lymphatics is exciting a good deal of attention, records what is known and indicates what is yet unknown about the lymph and the lymphoid tissue. The first half of the book describes the composition, formation and circulation of the lymph. It seems clear that, while proteins and particles, including bacteria, may escape from the blood capillaries together with fluid carrying solutes, only solutes with variable amounts of fluid can return again through the capillary wall. Protein molecules and particles, with the remainder of the fluid, must make their way back to the circulation by the lymphatics. The conditions governing capillary permeability under normal and pathological conditions are discussed, and there is a detailed account of the lymph flow from the various parts of the body. It seems that much is known about the lymph flow from some organs and regions of the body and hardly anything about the flow from others. Much work on lymph flow has been done in Professor Drinker's own laboratory.

Experiments have resulted in lymph being obtained from several of the less accessible parts of the body. In connective tissues the lymphatics seem to be relatively permeable, particles and proteins entering them with ease and rapidity. From mucous and serous surfaces, fluids and the smaller protein molecules readily enter the lymphatics, whereas the larger proteins and particles as a rule do so only very slowly. Absorption from the nasal cavity has been studied in great detail, and an account is given of the passage of virulent bacteria and viruses from the nasal mucosa into the cervical lymph. The authors think it almost certain that substances will only pass through the cribriform plate from within outwards. They believe that the lymph, and in particular the lymphocytes, may play an important part in the dissemination of viruses throughout the body. Although the vaccinia virus, which is pathogenic for rabbits, can be isolated from the cervical lymphatics soon after instillation into the animal's nose, it is apparently impossible to detect the virus of poliomyelitis in the lymph after it has been dropped into the nasal cavities of monkeys.

Factors controlling the flow of lymph are discussed at length. In the limbs, at any rate, the flow is more or less independent of the production of lymph; the formation of lymph depends on capillary permeability, but the removal from the tissues of the fluid so extruded depends almost entirely on extrinsic factors such as movement, massage and posture. The authors maintain that lymph and tissue fluid are identical; but it is not clear how much of the fluid actually exists free among the tissues.

The second part of the book reviews the many theories which have been brought forward to explain the functions of lymphocytes and lymphoid tissue. The mystery remains complete, but the summary of a very extensive literature is an able one. It is interesting to learn that phylogenetically the lymphoid tissue has quite a separate origin from the lymphatic vessels. The authors go to some lengths to emphasise their belief that the lymphatics play a very small part in the reduction of œdema in the limbs. It is difficult to agree with them since, as they point out, it has been clearly shown that the lymphatics in œdematous areas are held widely open; thus the flow of lymph along them would be greatly augmented by movements and pressure so slight as to produce little increase of flow in a normal limb. Again, the reader is not left with a clear idea of the view the authors take about the part played by the lymphatics in the body's fight against infection.

Sick Children

(4th ed.) DONALD PATERSON, M.D. Edin., F.R.C.P. London: Cassell and Co. Pp. 610. 15*s*.

THIS is one of the smaller handbooks of children's diseases, but it is unusually comprehensive. To take two examples: mental tests suitable for various ages are printed in an appendix; and there is a set of radiograms showing the ossification of the wrist and hand from birth to the age of fifteen. The index is fairly good and the illustrations are excellent. A number of items are frankly abstracts, references to the originals being faithfully given; and the effect of authenticity thus produced is maintained by the practical tone of the whole book.

Textbook of the Practice of Medicine

(6th ed.) Editor: FREDERICK W. PRICE, M.D. Edin., F.R.C.P. London: Humphrey Milford, Oxford University Press. Pp. 2032. 38*s*.

AFTER many war-time vicissitudes the new edition of this well-established textbook has at last appeared. Revision, though widespread and on the whole adequate, has been mainly in detail; such innovations as the sulphonamide group, the newer insulins, chest-leads in electrocardiography, and rupture of the intervertebral disc have been introduced. The two war years which have elapsed since the last edition appeared have witnessed comparatively few advances in medicine, but it is somewhat surprising to find no reference to the medical aspects of poison gases or of shock, and a section on military medicine would not have been out of place. More space is allotted to visceroptosis than to either carcinoma of the stomach or jaundice and the Meulengracht diet is dismissed in a few scathing words. The section on diabetes mellitus is more likely to confuse than enlighten the reader, and perhaps the editor should have made it clearer that his own views on primary cardiac strain are unorthodox. Of the 99 illustrations all but 22 (of which at least 2 could have been spared) fall in one section. These are minor criticisms and the new edition is well representative of the teaching of the London medical schools.

Second Yearbook of Research and Statistical Methodology

Editor: O. K. BUROS. New Jersey: The Gryphon Press. Pp. 383. $5.

IN this second venture, which in minor ways is a great improvement on the first, the editor lists 359 books, written in English and published since 1933, which deal with statistical methods, scientific methods, social relations of science and similar subjects, together with selections from the published reviews of them. Any such list is clearly helpful to the research worker, the teacher and the taught, but the value of "evaluative comments" contained in reviews is open to some doubt, reviews of the same book being often laudatory, derogatory or vacuous according to the school of the reviewer. Many reviews deserve no further publicity than they originally received, though Mr. Buros rather optimistically hopes that his reproduction of them will stimulate editors and reviewers to do better. Given sufficient help and money he would like to extend his field to books in other languages and to non-critical and critical abstracts of the literature on research and statistical methodology. This might be of greater benefit to interested workers than the present pages of extracts from many reviews of the same book. Incidentally, the index of names leaves much to be desired, the page reference being to the book listed. Mr. A., therefore, is mentioned in connexion with book no. 20, but since references to book no. 20 occupy 11½ pages it takes Mr. A. some time to learn what is said of him or what he said of it.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 22, 1941

REST FOR INFLAMED TISSUES

NATURE'S method of healing has never altered; it is our technique of how to assist her that changes. Rest has always been the most natural ally of the vis medicatrix naturæ on which all healing depends. A long line of "Menders of the Maimed" in British medicine—HUNTER, HILTON, HUGH OWEN THOMAS and others—taught that inflamed tissue is capable of dealing with its enemies unaided if kept at rest. But there are varying degrees of rest. To lie in bed does not necessarily keep the whole body at rest, the many splints are not always effective, and any fixation by traction will exert a pull on diseased structures. There is no doubt, however, that strict local rest of the injured part is obtained by the closed-plaster treatment of infected wounds. THOMAS and many others would not use plaster because they felt that it impeded the circulation in the diseased part. But a properly applied plaster supports rather than constricts the vessels of supply. The comfort of the patient in plaster is our surest proof. Muscles are tissues with high vascular demands, and, as we know from Volkmann's contracture, when there is compression of the main vessel the muscle will die long before there is skin involvement, and any shortage in its blood-supply is soon demonstrated by exquisite pain. In the resting limb the maximal blood-flow is determined to a great extent by the diameter of the larger supplying arteries. A good blood-supply, and therefore an intact major vessel, is the sine qua non of the closed-plaster method of treatment. As TRUETA has urged, if the blood-supply of the limb is jeopardised either by trauma or operation, treatment in closed plaster is to be avoided. A trickling stream will provide special opportunities for the flourishing of organisms, especially anaerobic, and against these early operative interference is our most useful aid.

The theoretical basis of the closed-plaster treatment is by no means fully understood. Exactly how does a plaster prevent the spread of infection? SAMPSON GAMGEE believed that pressure on a wound directly benefits the development of the cells in it by preventing degeneration and vacuolation; WINNETT ORR ascribed a special virtue to the soft paraffin with which he packed the wound; ALBEE suggested that bacteriophage is produced under the plaster; and GARCIA ALONSO maintained that a sort of civil war among the various types of bacteria confined under the plaster prevents the domination of pyogenic organisms. Probably all these views hold something of truth, but the experimental work of BARNES and TRUETA [1] offers the most likely explanation of the success of complete immobilisation. The flow of the lymph is the clue. It has long been known that the capillary endothelium of the blood-vessels is resistant to bacteria and that infection reaches the blood-stream via the lymphatic circulation. Anything that diminishes the flow in this lymph will therefore help to localise the infection, and DRINKER showed and BARNES and TRUETA have confirmed that if a limb is immobilised the flow of lymph almost ceases. It apparently does not cease completely, for, as CRESSMAN and BLALOCK [2] point out, transmitted arterial pulsations probably produce some slight movement of lymph. This movement CLARK and CLARK [3] describe as a "bobbing" back and forth synchronous with the heart beat or respiration, with only a sluggish forward movement. Besides the lymph-trunks, which via the glands lead to the blood-stream, the lymphatic system consists of a network of anastomosing, interlacing vessels. Thus, if there is movement, not only does the lymph carry bacteria to the lymph filters, and on rare occasions to the blood, but local spread takes place because infection is squeezed into the lymphatic meshwork. BARNES and TRUETA demonstrated experimentally that manual compression of the muscles produces no increased flow in the lymph-trunks but that full joint movement does greatly increase the flow. Hence the importance of immobilising the joints above and below an infected wound. Immobilisation has, of course, other important functions. It protects the frail capillary endothelium, which tears readily and waits with pouting mouths for further organisms. A dressing with the gentlest hands is then like the tramplings of an elephant's feet. GAMGEE knew the importance of support for tissues which through bruising, incision or œdema have lost their natural elastic support. DICKSON WRIGHT taught the same in the treatment of varicose ulceration, where he showed that lack of support interfered with the blood-flow and that even pressure was the surest way to get the best blood-supply and healing. WINNETT ORR recognised the fragility of capillary endothelium and that is why he recommended soft paraffin. TRUETA realised that, provided the limb was at rest, a multiplicity of organisms disporting themselves on the wound surface interfered but little with wound healing.

There has always been the fear of ankylosis of the associated joints when immobilisation is prolonged. For acutely inflamed joints it was even the habit in the last war to insist on the patient moving despite the exquisite pain. Over fifty years ago THOMAS condemned this practice in a forcible manner when he wrote: "it is as reasonable to attempt to cure a fever patient by kicking him out of bed as to benefit joint disease by wriggling at the articulation." OGILVIE [4] has said the same in discussing the treatment of wounds and sepsis of the knee-joint. He maintains that immobilisation must be continued until infection is clinically overcome, and that the joint must therefore be completely immobilised for a minimum of three weeks. The slightest movement, such as changing a plaster, will result in a flare-up, and to immobilise a knee-joint absolutely nothing less than a hip spica will do. To stretch damaged or healing tissues by early movements does not loosen them but actually results in the laying down of more and more scar tissue in the lines of strain. Where it is particularly important to avoid scar formation, as in septic

1. Barnes, J. M. and Trueta, J. *Lancet*, 1941, 1, 623.
2. Cressman, R. D. and Blalock, A. *Proc. Soc. exp. Biol. N.Y.*, 1939, 41, 140.
3. Clark, E. R. and Clark, E. L. *Amer. J. Anat.* 1932, 49, 441.
4. Ogilvie, W. H. *Lancet*, 1941, 1, 471.

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burns, immobilisation in plaster is being used to keep the healing tissues at rest; and in the deep burn it also enables a barrier of granulations to develop which seals off important structures such as tendons and joints.

In the early stage of acute sepsis, except when there is lymphangitis, the use of closed plaster to secure the essential strict immobilisation does not seem desirable. In the closed progressive acute lesion, where pus has still to be evacuated, the closed plaster will increase the tension in the tissues walling the forming abscess and is thus to be avoided. The time for plaster only begins when effective drainage has been established. The experimental work of TRUETA and BARNES shows that only in the draining, inflammatory limb will plaster cause the lymph flow to cease. In the early stage of acute sepsis, therefore, strict immobilisation of the joints above and below by splintage, either by plaster slab or other material, is called for. As soon as drainage is established the closed-plaster method can be applied. As in wounds of war the closed-plaster method is for the open draining wound. FRASER [5] has used this method in the treatment of acute osteitis, where after drilling the bone, as advocated by STARR, he packed the wound and encased it in plaster. DODD [6] insists on strict immobilisation in the treatment of multiple boils. He thinks that any movement —squeezing, bathing or fomenting—may detach infected thrombi which may settle in the skin, or may form abscesses in the kidney, ischiorectal fossa or bone. He therefore confines the patient to bed, securing rest by infrequent dressings, and by splinting (even for boils of the neck, where he uses a long back splint with foot piece for the head) and his results have been gratifying. He also [7] advocates complete rest in the management of abdominal distension after operations on the gut, and most surgeons would agree that immobilisation is the principle to be followed in all forms of intra-abdominal inflammation, though they might differ as to the method by which rest is best secured—for instance, when and in what dosage should morphia be given? In the treatment of infected fingers there has also been difference of opinion about the value of immobilisation. As JEAN PIERRE DAVID of Rouen wrote in 1779: "there is a time for rest and a time for motion in the treatment of most surgical conditions." Those who use plaster for wounded fingers hold that complete rest for two or three weeks does not lead to stiffness, and longer periods are harmless if the position of the fingers is changed once a fortnight. When the inflammation has subsided, they say, and there is no risk of tearing capillaries or spreading infection, movement should begin.

Nevertheless in all these cases the disadvantages of immobilisation, especially if long continued, must be recognised, the inconvenience of the patient must be considered and a balanced outlook maintained. The theoretical foundations of the principle of complete rest have been established, and in this war its application to infected wounds has been brilliantly successful; it still remains to extend its use and define its indications for the treatment of other infections.

5. Fraser, J. *Ibid*, 1934, **2**, 272. 6. Dodd, H. *Ibid*, 1941, **1**, 558. 7. *Ibid*, 1940, **2**, 98.

THE HAY-BOX REDIVIVUS

SINCE the beginning of this century the hay-box has enjoyed a deserved reputation among connoisseurs of cookery, and also among lazy amateur cooks who prefer other activities to standing over the cooking stove. It is well known that cooking is possible below the boiling point of water. Indeed it is doubtful if the interior of a roast joint ever reaches such a temperature. The juiciness, palatability and digestibility of the inner cuts are largely due to this fact. Many high-class restaurants use the plan of raising the temperature of the outside of their joints to a high point for a short time in the oven and then removing them to a place where the temperature is lower, so that cooking may continue slowly for a considerable time. This not only produces a more tender cut but is economical in that not so much of the juices of the meat are lost to the exterior. Cooking is much slower by these means, but much less attention is needed after the initial stage, and where time is of little consideration slowness is no disadvantage. A similar principle underlies the cooking of food in a hay-box. Food is brought to the boiling point and then after a few minutes' exposure to that temperature is transferred in its container to a heat-insulated box and left for hours to cook in its residual heat. For many years there have been on the market "fireless cookers" which work on this principle. Foods are boiled in highly polished saucepans, which, when their contents are hot throughout, are removed, tightly sealed, to a metal-lined container into which the saucepans fit snugly. This container is insulated from heat loss by a packing of kapok, asbestos or some other non-conductor of heat. Some hours later, when the container is opened, the food is found to be admirably cooked and may still be smoking hot and ready to serve. An amateur apparatus can easily be constructed from a packing case with hay as the non-conductor, using a weighted cushion also stuffed tightly with hay as a lid. Hence comes the term "hay-box cookery" for all such methods of preparing food for the table.

Hay-box cookery comes to the fore in war-time. It saves fuel. It needs little attention. It releases a person for other duties. When, as at present, married women are at work on munitions, it may solve the problem of the hot meal on the return home at the end of the shift. Also foods can be cooked overnight so that little preparation is needed in the morning before an early start for the works. Earnest amateurs therefore rush in to instruct the working-classes in hay-box cookery, and this naturally arouses the inhibitory instinct of other earnest amateurs who ask "What about killing (sic) the vitamins?" The hay-box has sundry disadvantages. The home-made apparatus is not easy to make or to keep sweet and there is a considerable destruction of vitamin C varying with the length of time the foods remain in the box. Experiments on brussels sprouts, kale and potatoes show a diminution which in the two last named is really serious. Brussels sprouts, with 123 mg. per 100 g. in the raw state have this reduced to 66 after boiling for 15 minutes. Two hours cooking in the box, after this, reduces the amount to 29 and six hours to 24. The sprouts have thus lost two-thirds of their original content, though even so they are still a valuable source of vitamin C. The potato,

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starting with 13–27 mg. per 100 g., has this amount reduced to 1 or 2 mg.—a worthless amount. Kale suffers a reduction from 155 mg. to 7, this making it almost useless as a source of vitamin C, though still valuable for vitamin A and probably for calcium and iron. There can be little doubt that similar facts would be discovered with other sources of vitamin C such as swedes, turnips and spinach.

None the less, the hay-box used with discretion is an extremely valuable addition to cooking appliances even in peace-time and may be invaluable in war-time. It will cook most vegetables, stews, meats for boiling, and most cereals and milk puddings, though it is not very successful with rice. And foods left to cook in it are usually hot even after a lapse of 6 hours, depending on the efficiency of the heat insulation and the initial volume of the food. The discretion necessary can be taught and learnt unfortunately only by those with a modicum of dietetics and a knowledge of where to turn for information. It is a gross pity that there is a dearth of trained dietitians to educate the public in hay-box and other cookery, and that, though the need has been outspoken for the last decade and more especially since the war began, little or nothing has been done by any ministry or public educational body to supply such teachers.

IMMUNITY TO TETANUS

TETANUS is, like gas gangrene, a rare infection in civil practice; both need the opportunity of wounds peculiar to warfare if they are to flourish. The deep penetrating wound soiled by infected earth or clothing and left unattended for twenty-four hours or more provides the ideal conditions for the anaerobic growth of *Clostridium tetani*, and it was only when such wounds were surgically excised and the patient given prophylactic tetanus antitoxin that the incidence of tetanus in the 1914–18 war was reduced from 8–9 per 1000 to less than 1 per 1000. Since then, active immunisation with tetanus toxoid has passed from the experimental stage and the protection of army horses against lockjaw to its clinical application for the protection of the armed forces. BOYD[1] showed that immunity to tetanus, taking 0·01 unit of antitoxin per c.cm. as the effective lower limit, could best be obtained by giving two injections each of 1 c.cm. of tetanus toxoid at an interval of not less than six weeks. The injections produce little or no upset; the only undesirable complication is the rare occurrence of an anaphylactoid reaction after the second dose, apparently due to a protein derivative in the culture-medium,[2] and readily countered by an injection of adrenaline. That this risk is very rare is borne out by the absence of systemic reaction noted by PESHKIN[3] in the immunisation with alum-precipitated diphtheria and tetanus toxoid of 186 allergic children.

The efficacy of BOYD's method of immunisation was largely substantiated by the absence of tetanus among the 80% or so of the B.E.F. in France who were actively immunised, for circumstances prevented a large proportion of the wounded from getting in addition the recommended dose of tetanus antitoxin[4]; yet cases of tetanus were reported only among those who were not actively immunised. Confirmation of BOYD's preliminary work has lately come from two sources in this country. MARVELL and PARISH,[5] who recommended intramuscular rather than subcutaneous injection, found that in 116 persons given two 1 c.cm. doses of tetanus toxoid at an average interval of six weeks the titre was less than 0·01 unit per c.cm. in only 13 out of 187 blood-samples tested at intervals ranging from one to nine months after the second injection; 11 of these 13 samples were examined six to nine months after the second dose. It was noted that women responded better to immunisation than men, whereas staff (stablemen and technicians in the tetanus laboratory) whose work might bring them into contact with tetanus toxin gave no better response than other male staff. Those with low titres after the second dose were given a third "boosting" dose which was most effective in raising the titre if given after a long interval (seven to nine months); PESHKIN noted the same phenomenon among his immunised children. These findings have been substantially corroborated by EVANS. On another page he records an investigation of blood-samples from staff of the National Institute for Medical Research who were given two doses of tetanus toxoid at an interval of nine weeks. While none of 81 subjects had 0·01 unit of antitoxin per c.cm. before the first injection, nine weeks later a fifth of them developed more than 0·1 unit in response to the first dose, which suggests that some of them already had a low basal immunity. The second injection brought every person above the 0·01 threshold, and the level of immunity noted seventeen weeks after this dose was largely maintained ten months later; MARVELL and PARISH, and PESHKIN, on the other hand, noted a waning immunity in a proportion of cases with the lapse of time. Like them, EVANS found that a third dose given after an interval of ten months produced a striking rise in titre. Thus, the "injection de rappel" of the French, given a year or so after primary immunisation, has much to recommend it, for it boosts up an already existing immunity and gives the necessary additional stimulus to those few people who do not respond to the first injections. An alternative, and apparently effective, method of immunisation against tetanus is that recommended by RAMON and lately supported by MACLEAN and HOLT[6]—the combination of tetanus toxoid with T.A.B. vaccine in two doses given at a month's interval. With this combination the immediate antibody response to the tetanus toxoid was much greater than when toxoid was used alone, but the subjects were not followed up to find if the immunity was maintained. Another point which is still at issue is whether it is better to give a wounded and immunised man a further injection of toxoid, as French and American authorities advise, or a dose of tetanus antitoxin as is the recommendation of our Army Medical Service. It is conceivable that in a shocked and unattended soldier infected with *Cl. tetani* the sudden liberation into the circulation of toxin accumulated at the site of injury might do irreparable damage before the host's protective mechanism could be stimulated to produce antibody; in such cases artificial antibody seems desirable. Where infection occurs in a healthy non-shocked person, the toxin produced in situ should provide the necessary stimulus without artificial aid from outside.

1. Boyd, J. S. K. *J. R. Army med. Cps*, 1938, **70**, 289.
2. Parish, H. J. and Oakley, C. L. *Brit. med. J.* 1940, **1**, 294.
3. Peshkin, M. M. *Amer. J. Dis. Child.* 1941, **62**, 9, 309.
4. Perry, H. M. *Brit. med. J.* 1940, **2**, 364.
5. Marvell D. M. and Parrish, H. J. *Ibid*, 1940, **2**, 891.
6. MacLean, I. H. and Holt, L. B. *Lancet*, 1940, **2**, 581.

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Annotations

A MINISTRY OF MEDICAL SERVICES

THE demand for a reorganisation of our medical and health services grows increasingly vocal, the latest exposition being contained in a booklet[1] published by the British Association for Labour Legislation, and written by Dame Janet Campbell and Dr. H. M. Vernon, both of whom have long experience of public administration as well as of clinical work. Written mainly for the lay public, the greater part of the book is occupied by a summary of the recognised merits and defects of the health services as they exist and function at present—facts with which most medical readers are now familiar. The authors agree that the main object to be borne in mind in reconstructing our medical services is to secure, for every man, woman and child in proportion to their several needs, all the medical skill, knowledge and institutional amenities available, independently of individual ability to pay for them. As to method, Dame Janet Campbell apparently favours a great extension and expansion of the panel service: first because it is a system in being; and secondly because it goes a long way towards satisfying the democratic case for freedom of choice. She would also make it include necessary consultant, specialist and hospital services. The approved societies would cease to have any connexion with the medical services, beyond accepting the doctor's certificate of sickness and incapacity—though, as a matter of fact, apart from what are now called extra benefits, there is little other connexion at the present time. But the novel suggestion of the booklet is that the medical and nursing services should be altogether dissociated from the Ministry of Health, a new "Ministry of Medical and Nursing and Social Services" being set up to organise post-war medical reconstruction. It may well be doubted, however, if it would be wise from a national point of view, or in the long run from the narrower point of view of the profession, to dissociate doctoring and nursing from other organised state activities which, we are coming to realise, have a direct bearing on national and personal health.

SURGERY FOR SYRINGOMYELIA

WHEN the nature of a disease is imperfectly known the response to various forms of treatment carried out more or less empirically must be the principal guide to its management. For this reason the paper in which Worster-Drought, Wakeley and Shafar[2] record their experience of surgical treatment in ten cases of syringomyelia is of considerable importance. There are two good reasons for operation when cavitation causes distension of the cord so gross as to block the subarachnoid space. One is that the pressure on the long tracts in the cord can be most effectively relieved by draining the cavity; the other is the possibility that the signs and symptoms may be due not to a syringomyelic cavity but to an intramedullary tumour. It must be recognised, however, that cavitation rarely progresses to this extent—in the present series, for example, only one out of the ten cases showed signs of a subarachnoid block, though it may be added that, as one might expect, considerable improvement followed operation in this case. Three other patients, however, derived similar benefit from the opening up of cavities which had neither obstructed the subarachnoid space nor produced symptoms in the legs, though changes in the reflexes did indicate some interference with the long tracts. Under such circumstances the permanent clinical manifestations must be due to local destruction of the cord, while the signs which clear up after the cavity has been drained may be attributable to œdema and vascular changes in its immediate neighbourhood. These changes seem to be caused by the pressure within the cavity, which Worster-Drought and his colleagues consider the most important factor influencing the response to surgical treatment. This pressure does not necessarily vary directly with the size of the cavity, but should it be low little can be expected from operation, since signs and symptoms then depend entirely on destruction of nervous tissue and glial overgrowth, neither of which can be affected by myelotomy. Unfortunately it is not possible to distinguish clinically between the two pathological varieties of syringomyelia—the "dry" form in which gliosis predominates and surgery is useless, and the "wet" in which cavitation is the chief feature and removal of the fluid may be beneficial. In addition to draining a cavity an attempt may be made to prevent its refilling either by making the drainage opening a permanent one or by obliterating the cavity. The former may be achieved by fixing silver clips to the edges of the opening, by placing muscle tissue between them, or by suturing the lining membrane to the arachnoid on each side. In the present series the walls of the cavity, which had fallen into apposition after escape of the fluid, were painted with tincture of iodine in the hope that the resultant inflammatory reaction might lead to their permanent adhesion with obliteration of the cavity. It is to be hoped that other surgeons will record their experience so that some estimate may be formed of the proportion of cases of syringomyelia which may be expected to benefit from operation. Unfortunately it will not be possible to foretell the result in any individual case until the distinction between gliosis and cavitation can be made on clinical grounds with a greater degree of accuracy than is now possible.

MAN-POWER OF THE DISABLED

AN injury which disables a man for the occupation he has been following does not necessarily incapacitate him for other useful work. The Minister of Labour has prepared a plan[1] for training people disabled while on war service or in civil life and for settling them again in industry. He believes that large numbers of disabled men and women could hold good jobs on their merits and not simply because of considerate treatment. For the time being preference in training may be given to war-service or air-raid victims, but the scheme will form the basis for a post-war resettlement scheme covering all persons over 16 disabled in road, industrial or factory accidents. The value of rehabilitation is not only that it fits a man to earn his living but that properly used it can restore power to damaged muscles and joints and thus reduce disability. This was proved during the last war, and remains a principle at Enham Village Settlement; it was recently illustrated by the report in our columns on 40 cases treated at the Allendale Curative Workshops.[2] The Minister of Health is favouring hospital schemes for the rehabilitation of injured people, and Mr. Ernest Bevin's plan is designed to work in with these schemes. The patient will be interviewed by a representative of the Ministry of Labour while he is still in hospital and the choice of suitable training for him will depend on his own preference, on the nature of his disablement and on the opportunity and demand in particular trades. By conferring with the physicians and surgeons in charge of the case it should be possible to arrange work within the patient's capacity, and such early contact with him should enable the ministry to plan ahead and ensure that a job is available when he is ready to take it. No doubt many patients will be able to resume their former or

1 "National Health Services." From the Secretary, 21, Claireville Grove, London, S.W.7. Pp. 46. 9d.
2. Worster-Drought, C., Wakeley, C. P. G. and Shafar, J. *Brit. J. Surg.* 1941, 29, 56.

1. Interim scheme for the training and resettlement of disabled persons. Pp. 8. From the Ministry of Labour, St. James's Square, S.W.1.
2. *Lancet*, Nov. 1, 1941, p. 516.

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another occupation without training. Information about their capacity, obtained from the hospital, will be passed to their local employment exchanges and they will be invited to seek help there if they find difficulty in getting employment.

The Ministry recognises how important it is for the man to achieve the fullest possible physical restoration both during the time he is in hospital and when he begins work, and that if he is to keep his job when peace returns he must be fitted to do not any job passably but one particular job better than most; and it must be a job which will still exist in peace-time. It may well be true, as the Minister of Labour says, that 75% of disabled people are fit to take up some kind of work again, and that they could master many of the processes now being taught at Government training centres and technical colleges. The scheme puts such training in the forefront. Since it will not be easy in such centres to give curative as well as technical training, courses are also to be provided at institutions which already have special experience of preparing the disabled for industry. In addition it is hoped that some employers will agree to provide training for disabled men. But there is some evidence that people who have qualified at Government training centres are not always being used, at present, on the work for which they have been trained. It would need much closer supervision of the factories than is now customary to ensure that the disabled employees are never given work detrimental to their condition. If a return to work produces a loss instead of an advance in power and function, it will be a disaster to the injured person instead of a benefit. All this applies with special force to patients boarded out of the Army, many of whom at present flit uneasily from unsuitable job to unsuitable job before finding one within their compass, or too often lapse into the ranks of the unemployable. Possibly, too, the official attitude to the question of reabsorption into industry has been too narrow, harping too much on surgical conditions, which though they cover most of the air-raid casualties represent only some 20% of the conditions compelling discharge of men from the Army. Medical conditions are probably responsible for almost as many incapacities among the civil population as among soldiers. Nicoll[3] has discussed the rehabilitation of the injured with reference to the coal-mining industry, and much of what he says holds for a range of disabilities stretching far beyond the results of injury.

Mr. Bevin plans that training allowances of 42*s.* a week shall be paid to men, 33*s.* to women, 17*s.* to boys and 15*s.* to girls. This wide discrimination between the rates to the sexes seems scarcely necessary, since dependants' allowances are to be paid to those in training at the rate of 7*s.* 6*d.* for a wife and 3*s.* for each child. The principle of Mr. Bevin's plan, however, is so good that we must hope to see it put speedily into force; minor defects can be put right once it is working.

OPERATION FOR HYPERTENSION

THE experimental finding that in animals renal ischæmia will produce persistent hypertension has clinical implications which are now being explored. At a combined meeting of the sections of medicine and of therapeutics and pharmacology of the Royal Society of Medicine on Nov. 11, Prof. G. W. Pickering gave it as his opinion that experimental results will in due course explain most of the human cases of hypertension. Dr. Clifford Wilson had produced renal lesions in rats by partially occluding one of the renal arteries; pathological changes were found only in the kidney with an intact circulation and were completely absent in the clamped kidney; they consisted of fibrinoid arteriolar necrosis and endarteritis with occasional involvement of the glomeruli, and closely resembled those in sections from human cases of malignant hypertension. He suggests that the histological changes found in the kidney in the terminal stages of Bright's disease are produced by hypertension. Since the lesions in experimental animals only affect the unclamped kidney the most obvious explanation seems to be that they are caused by the hypertension, and this suggests a vicious circle: renal ischæmia leading to hypertension which in turn produces renal vascular lesions with increased renal ischæmia, and so on.

In the last year or so there have been a number of reports of hypertension associated with non-nephritic kidney disease, and in cases where the lesion was unilateral removal of the affected kidney has given encouraging results. Dr. Robert Platt, at the same meeting, described such a case in a girl of 8 who had a blood-pressure of 220/120 mm. Hg and bilateral papilloedema and retinitis. A year before, investigation for *Bacillus coli* infection had shown a functionless left kidney. The prognosis at the time of the second examination was so grave that the affected kidney was removed and proved to be small and hypoplastic. The day after operation the blood-pressure fell to 155/95 mm. Hg and five months later was only 125/70. The child has remained well and has now no swelling of the discs or retinal œdema. Similar cases of unilateral nephrectomy were summarised recently in our columns by Richardson and Smart,[1] who added 2 cases of their own to those recorded. One of these was a case of tuberculosis of the kidney and the other of hypernephroma; in both, removal of the damaged kidney caused a dramatic fall in blood-pressure maintained for several months, up to the time of publication. Barker and Walters[2] have reported successful results of operation in 5 cases of unilateral pyelonephritis. All the reported cases are readily explained by analogy with experimental results; they are generally associated with occlusion of the renal artery or vein, diminished urinary outflow, or disease of the kidney substance.

The biochemical aspects are being investigated by several groups of workers, intent on isolating the active substances produced by the damaged kidney and causing the rise of blood-pressure. Their findings up to the present were reviewed in our issue of Nov. 8 (p. 575). In the meantime it is evident that the renal function must be investigated in all cases of hypertension. Presumably many cases of hypertension with unilateral renal dysfunction might be saved by operation, provided removal of the damaged kidney was carried out before vascular changes have been produced in the contralateral kidney. An example of such a case is to be found in the report by Davson[3] of an autopsy in which one kidney showed a hydatid cyst and the other the typical histology of malignant hypertension, presumably secondary to the partial occlusion of the renal vessels of the opposite side by the growth of the cyst.

It remains to be seen what proportion of cases of hypertension are due to renal ischæmia. No certain correlation has been shown between non-nephritic kidney disease and hypertension, but Goldblatt's experiments do not suggest that the renal damage necessary to cause hypertension need be gross; in fact as a rule renal function is normal in his animals during experiments. Slight degrees of blockage in the renal arteries of man cannot necessarily be demonstrated during life by methods so far evolved, and at present the only certain way of proving that hypertension is not associated with such minor degrees of occlusion is to wait for the autopsy report. A series of such reports has been recorded by Blackman[4] who investigated the renal arteries of 50 cases of so-called essential hypertension and found the

3. Nicoll, E. A. *Brit. med. J.* April 5, 1941, p. 501.

1. Richardson, G. O. and Smart, G. A. *Lancet*, Nov. 15, 1941, p. 594.
2. Barker, N. W. and Walters, W. *J. Amer. med. Ass.* 1940, **115**, 912.
3. Davson, J. *J. Path. Bact.* 1941, **53**, 207.
4. Blackman, S. S. *Bull. Johns Hopk. Hosp.* 1939, **65**, 353.

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extraordinarily high proportion of 86% with some degree of stenosis. He also found that clinical and histological evidence of vascular nephritis was present in only 56% of cases. In all 50 he found arteriosclerotic plaques in the intrarenal arteries. It is noteworthy that Goormaghtigh claims [5] to have demonstrated endocrine cells, similar to the chromophil cells of the anterior pituitary, in the walls of the renal arterioles of animals, and he states that during clamping of the renal artery these cells become hyperplastic. If his findings are confirmed pathologists may be able to demonstrate similar cells in human kidneys from cases of hypertension.

RENAL COMPLICATIONS OF CHEMOTHERAPY

HÆMATURIA is now established as an important complication of treatment with sulphapyridine and the more recent chemotherapeutic drugs. The clinical picture produced has been described by Laird [6] in three stages. In the first stage, hæmaturia is microscopic only and pain is sometimes present; in the second, the hæmaturia is gross and usually accompanied by pain, but clears up rapidly on withdrawing the drug and giving ample fluids; and, in the third, despite such remedial measures, there is impairment of renal function which may lead to nitrogen retention, anuria and death. Treatment is straightforward, withdrawal of the drug and the pushing of fluids producing rapid improvement in cases in the first and second stages. Where it is impossible to administer abundant fluids by mouth because of vomiting or unconsciousness, 4·28% sodium sulphate with 10% glucose in normal saline should be given by the intravenous drip method. In the third stage, with anuria, ureteric catheterisation has proved a life-saving measure. Hæmaturia due to chemotherapy should be diagnosed in the earlier stages in which the simple measures are uniformly successful. It results from the deposition of crystals of the acetylated compounds in the renal tract, and Lehr and Antopol,[7] investigating the influence of urine on the crystal shape of acetylated sulphanilamide compounds, observed that the characteristic urinary crystals were not formed in highly dilute urines (sp. gr. 1014 or less). Macroscopic hæmaturia is thus most likely to develop in patients in whom the daily urinary output is allowed to fall below 1500 c.cm. It can be prevented by maintaining the daily fluid intake above 3000 c.cm., and it would be regrettable if the importance of this simple preventive measure became minimised by reports on the effects of the concurrent administration of alkali. Sunderman and Pepper [8] and Climenko and Barlow [9] have determined that acetylsulphathiazole is more soluble in alkaline than in acid urine; while Schwartz and others [10] have demonstrated a greater number and incidence of crystals of the drug in the urines of 50 pneumonia cases treated with sulphathiazole than in 50 comparable cases receiving the same drug in similar dosage but in which the concurrent use of sodium bicarbonate had rendered the urine less acid. In this investigation the urine was tested with litmus only and those giving a neutral reaction were included with those classed as alkaline; in addition, no record is given of fluid intake or the specific gravity of the urine specimens. The validity of the conclusions must be viewed with reserve until the work is repeated under more carefully controlled conditions. Furthermore, Loewenberg and his colleagues [11] have described a case of pneumonia, treated with equal amounts of sulphathiazole and sodium citrate, in which calculi of acetylsulphathiazole were found, although the urine was alkaline. Similarly with sulphapyridine there is evidence that the administration of alkali will not by itself prevent renal complications and that acetylsulphapyridine may crystallise out in alkaline urine.[12] Haviland and Bratton, in a personal communication to Sadusk and his colleagues have stated that the solubility of acetylsulphapyridine in urine remains essentially the same for a range of pH 3·3–7·4 and that its solubility at pH 7·9 is not significantly greater.

Alkalisation of the urine, then, cannot be counted on to prevent renal complications during chemotherapy, and any benefit that does result from alkalis is probably due to the diuresis they produce. But the fundamental requirement for adequate diuresis is an adequate fluid intake. We can take the patient to the water easily enough, but there is the familiar difficulty in making him drink. He must have the reason for the procession of glasses of water explained to him, and something can be gained by presenting the fluid in more attractive form, though even this is difficult now that citrous fruits are scarce. When the patient is vomiting other routes must supplement fluids by mouth. Much ingenuity will in fact be required on the part of the attendants if the necessary five pints a day are to go in, but if they are taken and retained we can be as sure as anything is in medicine that there will be no crystallisation of the drug in the renal tract.

RADIOGRAPHY OF THE HEART

IN the examination of the heart radiography is still widely regarded as a poor second to electrocardiography. This is partly because the latter method is older and the necessary apparatus more compact. A more substantial reason however is that the information given by the electrocardiogram is usually clear-cut whereas the shape and size of the heart are subject to wide normal variation according to body-weight, shape of the thorax and movements of respiration, which must be discounted before any deductions are drawn. The value of radiology has recently been emphasised by Denstad,[13] whose work brings into prominence the pathological conditions which, hidden to clinical and electrocardiographic examination, can be revealed by radiology. Although electrocardiographic changes and enlargement often run parallel, considerable enlargement can exist with a normal e.c.g., while severe changes, such as branch block or inverted T wave, may exist with little if any enlargement. From the diagnostic point of view radiography is of great value in mitral disease where the characteristic murmurs may be indefinite. In auricular fibrillation the heart is always enlarged, and Denstad believes that fibrillation can only occur after a certain degree of dilatation has been reached. In hypertension enlargement is generally commensurate with the severity of the symptoms and is a more reliable index of the prognosis than the blood-pressure. In this as in degenerative conditions radiology is of special worth since the enlargement cannot always be determined clinically. In pericarditis radiology gives invaluable information in revealing the size of the heart itself, the degree of calcification and fixation and hence the advisability of operation. The work of Denstad and others shows that without radiology the examination of the heart cannot be regarded as complete.

5. Goormaghtigh, N. *Compt. rend. Soc. Biol.* 1939, **132**, 465; *Arch. Biol.* 1940, **51**, 293; *Amer. J. Path.* 1940, **16**, 409.
6. Laird, S. M. *Lancet*, 1941, **2**, 272.
7. Lehr, E. and Antopol, W. *Science*, 1941, **94**, 282.
8. Sunderman, F. W. and Pepper, D. S. *Amer. J. med. Sci.* 1940, **200**, 790.
9. Climenko, D. R. and Barlow, O. W. *Lancet*, 1941, **1**, 770.
10. Schwartz, L., Flippin, H. F., Reinhold, J. G. and Domm, A. H. *J. Amer. med. Ass.* 1941, **117**, 514.
11. Loewenberg, S. A., Sloane, N. G. and Chodoff, P. *Ibid*, 1940, **115**, 2069.
12. Toomey, J. A., Reickle, H. S. and Takacs, W. S. *J. Pediat.* 1940, **16**, 179. Tsao, Y. F., McCracken, M. E., Chen, Ji, Kuo, P. T. and Dale, C. L. *J. Amer. med. Ass.* 1939, **113**, 1316. Brown, W. H., Thornton, W. B. and Wilson, J. S. *Ibid*, **114**, 1605. Sadusk, J. F. jun., Waters, L. and Wilson, D. *Ibid*, **115**, 1968. Smith, E., Evelyn, K. A. and Nolan, J. F. *Canad. med. Ass. J.* 1940, **42**, 27. Wilson, C. L. and Billingsley, C. B. *J. Amer. med. Ass.* 1941, **117**, 285.
13. Denstad, T. *Acta radiol.* 1941, suppl. 40.

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Special Articles

INJURIES AND DISEASES OF WAR

A NATIONAL PATHOLOGICAL COLLECTION

So far no steps have been taken to replace the specimens illustrating injuries and diseases of war which was made between 1914 and 1918 and housed at the Royal College of Surgeons. These were mostly destroyed in the air-raid of May 10–11 although, as noted in the college annual report, Tonks's famous pictures of the facial injuries of the last war are intact. The college and the War Office have asked the Medical Research Council to make a new collection and a subcommittee of the War Wounds Committee has been appointed to consider how this might be done. The three fighting Services, the Ministry of Health, the Department of Health for Scotland, the Royal College of Physicians of London and the Royal College of Surgeons of England are represented on the subcommittee, and they hope that the whole profession will help in the task of collecting material. This should include specimens, pictures, photographs and radiograms illustrating lesions produced by missiles, war gases, explosion gases, secondary missiles (such as fragments of masonry or debris), crush injuries, the effects of blast in air or water, and burns from any causes; there should also be material illustrating repair, infection and the results of treatment.

PRELIMINARY CARE OF SPECIMENS

The value of pathological specimens when mounted depends on discriminating choice of material, the care taken in collection and the preliminary treatment. The subcommittee offers the following advice.

Only those specimens should be chosen in which the lesions can be clearly displayed.

The collector should take every care to maintain the shape and form of the specimen during fixation, when the greatest amount of shrinkage and distortion is liable to take place. A hollow viscus or any tubular structure should be suitably packed with absorbent cotton-wool soaked in formol saline, before the specimen is immersed in the fixative. Structures such as nerves, arteries, segments of bowel or slices of solid organs should be fixed in position on a suitable frame, to prevent shrinkage, bending and distortion.

Fixation should be carried out in a convenient receptable such as a bucket (only if enamelled or tinned), a basin or a jar; the volume of the receptacle should be at least twice and preferably three times that of the specimen. This ensures that the greater part of the weight of the specimen is supported by the fluid, but cotton-wool should be placed at the bottom of the receptacle to prevent flattening. Bottles with relatively narrow necks, through which specimens would need to be forced, should be avoided. The receptacle should be covered with a lid, but need not necessarily be tightly corked.

The fixative used should be 4% formol saline. Stronger solutions do not give better fixation and tend to inhibit penetration of the tissues. In the case of solid organs, with the exception of the brain, the fixative never penetrates more than about ¼ in. For this reason all dissection and trimming should be carried out before fixation is completed.

The fixative is made up of: sodium chloride 9 g.; commercial formalin (40% formaldehyde) 100 c.cm.; water 1000 c.cm. Formalin solutions tend to become acid by oxidation to formic acid, and it is important that any acid formed should be neutralised. This can be done by adding a small quantity of carbonate of magnesia (mag. carb. pond.), chalk or marble chips to the stock solution, which should be stirred occasionally. The clear neutralised fluid for fixation can then be decanted as required.

The specimen should remain in the fixative until it is sufficiently hardened for safe dispatch by post to the receiving depot, where fixation will be completed if necessary. The time required varies considerably with the nature of the specimen. Small delicate specimens will be adequately fixed in a few hours, whereas larger, fatty specimens may require a week for fixation. Since glycerin and other mounting fluids are now almost unobtainable, no large-scale attempt will be made at present to restore the colour of specimens. The specimens will be stored in separate containers to prevent crushing and distortion, and they will be mounted when supplies of mounting fluids are available.

For dispatch by post, a specimen should be taken out of the fixative, drained of excess fluid, wrapped in lint moistened in fixative, and covered with jaconet. The parcel should then be packed in dry wood wool or sawdust, in a suitable box. The dry packing should be sufficient to prevent leakage during transit, and the box should be clearly labelled "Pathological Specimen." A precise history should be sent with each specimen, giving the cause of the injury, treatment and clinical progress, and emphasising any pathological point that the collector regarded as important. The name and age of the casualty, the hospital concerned, and the name of the collector should be stated. The history may be sent by separate post, or in the box with the specimen, provided that the papers are protected from damage by moisture. An acknowledgment, with comments on the condition of the specimen on arrival, will be sent to the collector.

Specimens are to be sent in the first place to one of two receiving depots where they can be temporarily classified and stored. For Scotland and the north the depot is the pathological department of the University of Leeds, and specimens should be addressed to Prof. M. J. Stewart. The depot for the south is at Hill End Hospital, St. Albans, Herts, and specimens should be addressed to Prof. Geoffrey Hadfield.

MEDICAL WAR RELIEF FUND

SINCE this fund was set up just over a year ago over £34,000 has been contributed by the medical profession at home and overseas to provide immediate help for British doctors and their families to whom the war has brought financial hardship. The need is sometimes temporary but it is almost always urgent; and within a few weeks of the fund's beginning the distribution committee had made its first awards, and during its first year 44 applicants have been helped with a total call on the fund of nearly £5000. They include the dependants of 5 doctors killed on active service; 16 doctors whose homes or consulting-rooms have been damaged by bombing; 7 who have lost their practices as a result of evacuation; 8 whose incomes dropped when they joined the services or who needed help to set up in practice again after resigning their commissions because of ill health. An award was also made to the wife of a doctor who has remained in one of the Channel Islands after the German occupation. The following three cases illustrate the scope of the work:

Dr. G., a senior general practitioner, lost his life in a raid in which his house was completely destroyed. His only child was killed at the same time. The widow lost her clothing and other possessions, and although the doctor's estate would eventually furnish her with a modest income, she was temporarily without means. She was awarded a suitable sum as a gift to provide for her immediate needs.

Dr. M., a specialist serving in the R.A.M.C., was killed on active service, leaving a widow and child. Mrs. M. has been awarded a gift (to be administered by the Royal Medical Benevolent Fund) which will supplement her small income during the child's remaining years at school. As Dr. M.'s elderly mother had been partially dependent on him a similar arrangement has been made in her case; and Mrs. M. senior has been introduced to two other benevolent societies, one of which has awarded her a small grant while the other has given more permanent assistance in the form of a small pension.

Dr. K. is an elderly consultant. His consulting-rooms were bombed and destroyed with the furniture, instruments and books which they contained. The income from his practice had diminished owing to the war and, although he had no debts of any magnitude, neither had he the means to acquire new premises and equipment while awaiting the payment of war-damage compensation. He was awarded a substantial sum for this purpose—the greater part as a loan and the remainder as a gift.

These cases show grants to widows and dependants which have been made as gifts, but where the applicant was a doctor whose troubles seemed to be temporary part of the help was given as a loan and some of these are already being repaid. The gifts amounted to £4795 and the loans to £3040. The distribution subcommittee of the fund has worked in close coöperation with the Royal Medical Benevolent Fund and acknowledges its debt to the accumulated wisdom and experience of that body. Not only has the R.M.B.F. provided applicants with persuasive introductions to other funds which have granted supplementary awards, but it has undertaken the administration of long-term educational grants, an arrangement which will assure widows with young children of continued counsel and help when the work of the war fund is happily accomplished.

The generosity of the B.M.A. and R.M.B.F. has made it possible to keep the administrative costs of the fund for the year down to £150, or less than 0·5% of the amount

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contributed. Economical administration and discerning distribution are necessary, for the greater part of the fund's work is believed to lie ahead. Contributions may still be sent to the hon. secretary at B.M.A. House, Tavistock Square, London, W.C.1.

OUTPUT AND THE WORKER

"APPLY EXISTING KNOWLEDGE"

THE 21st report of the Select Committee on National Expenditure [1] dealt with labour problems and war output, and the Government has now published as the 25th report [2] of the committee a detailed commentary on these recommendations. The replies are divided into broad categories such as hours of work, wages, management, discipline, industrial relations, transport, food, lighting in factories, and incentives to output. In the main the Government finds itself in agreement with the views of the committee but differs on some details. For instance, it is implied that the committee did not have a clear idea of the functions of the Industrial Health Research Board when it recommended that the board should work in the closest coöperation with, and advise the production departments. The responsibility of advising these departments on factory conditions and the health of the workers belongs to the Ministry of Labour—presumably through its Factory Department lately transferred from the Home Office—and the function of the board is to investigate general scientific problems. Another recommendation was that the board should carry out investigations to determine the best length of the working week for a wide range of different kinds of work and for men, women, and juveniles; but the board has been doing this kind of work for many years—its first emergency report [3] was a summary of its findings since the last war—and as it has indicated that weekly hours of work should not exceed 60 for men and 55 for women, it appears more useful to apply existing knowledge than to undertake further investigations which would be unlikely to produce different results. It is proposed, however, to carry out further inquiries into the conditions of some sections of industry and of particular kinds of work and to ask for the board's help.

The recommendation that workpeople should have one day's rest in seven has, in the Government's view, been confused with the question of Sunday labour. The committee is reminded that they said in their 17th report that the general atmosphere of Sunday is not conducive to the maximal effort, and with the object of maintaining production at its highest level most of the departments concerned agree that Sunday work should be restricted to essential maintenance or repair work and emergencies. Some aircraft firms have reported that Sunday work has been given up with beneficial results on output. Some workers have resisted the abolition of Sunday work because they receive double pay for that day, and the Government cannot accept the committee's recommendation that the loss of the extra payment for Sundays should be taken into account when fixing wage rates for week-days. It seems that 5½ or 6 days a week on production work is the best system which can be arranged and that rota systems are not easy to run because of the additional labour force required and inherent difficulties in organisation and supervision. The policy of the Government is, however, that factories should be employed for as much of the 24 hours as possible, and an increasing number are working round the clock.

In addition to the committee's recommendations employers have been urged to adapt women's working hours to allow them reasonable time for shopping and in some factories this has been done. Discussions have been held with retail trade organisations and with the Ministry of Food and shopkeepers are to be asked to keep their premises open for longer hours on one more day a week and to adjust the shop lunch-hour to suit the industrial workers, who may also leave written orders for goods to be collected after closing time.

The Government fully endorses the policy that managements should, where possible, take workpeople into their confidence and both groups are encouraged to come together for the exchange of information and experience. We said recently [4] that if workers are treated like children they will act like them and it is encouraging to see that the lesson is being slowly and painfully learnt. It is agreed that men should be appointed to positions of authority in industry, particularly as charge-hands and foremen, for their qualities of leadership and organising ability as well as for their technical skill. Publicity has been given to the established training courses for personnel managers, welfare supervisors, and foremen, and also to the work of the conciliation officers of the Ministry of Labour whose main function is to intervene when disputes arise between unorganised sections of industry and employers who do not recognise trade unions. It is emphasised that any publicity which created an impression that the services of the conciliation officers were immediately available to settle disputes by direct intervention would tend to undermine the constitutional authority of employers' organisations and trade unions.

In reply to a recommendation that a persistent offender who refuses to obey a direction under the Essential Work Order should be dereserved, the Government states that it has always been made clear that men are kept out of the forces for the purpose of working assiduously and those not doing so will not be allowed to remain reserved. But the specific proposal that military enlistment should be regarded as a penalty for industrial offences is open to objection and it would not meet with the support of the workers, nor, it might be added, of the armed forces themselves.

Transport difficulties and the measures needed to overcome them are discussed at length. The arrangements for supplying food to the workers are described and the Government cannot accept the recommendation that the Factories (Canteens) Order, 1940, should be applied to all factories doing work for the Crown, and not only those employing more than 250 people. For the smaller factories the policy is to establish British Restaurants nearby and the workers can either go to them or have meals sent to the factories. The committee pointed out in their report that speeches congratulating workpeople on their efforts make for complacency, but the Government says there is no need to stimulate them to greater output on the basis that their best efforts have been feeble and unsatisfactory. It probably should have been stated more definitely that if a worker is praised he will respond and will not become slack because he has been made to feel that he has done his best. There are varying types of complacency or states of euphoria. Report answers report on the whole satisfactorily and shows that constructive thought is being given to constructive criticism.

1. *Lancet*, 1941, **2**, 341.
2. 25th report from the Select Committee on National Expenditure. London: H.M. Stationery Office. Cmd. 124. 6*d*.
3. See *Lancet*, 1940, **1**, 699.
4. *Lancet*, 1941, **2**, 566.

Infectious Disease in England and Wales

WEEK ENDED NOV. 8

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1366; whooping-cough, 2029; diphtheria, 1069; paratyphoid, 31; typhoid, 12; measles (excluding rubella), 747; pneumonia (primary or influenzal), 731; puerperal pyrexia, 108; cerebrospinal fever, 113; poliomyelitis, 33; polio-encephalitis, 4; encephalitis lethargica, 3; dysentery, 148; ophthalmia neonatorum, 84. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 5 was 1315, including scarlet fever, 166; diphtheria, 298; measles, 23; whooping-cough, 505; enteritis, 32; chicken-pox, 28; erysipelas, 22; mumps, 5; poliomyelitis, 6; dysentery, 23; cerebrospinal fever, 22; puerperal sepsis, 8; enteric fevers, 45; german measles, 1; other diseases (non-infectious), 62; not yet diagnosed 69.

Deaths.—In 126 great towns there were 1 (0) deaths from enteric fevers, 1 (0) from scarlet fever, 1 (0) from measles, 2 (0) from whooping-cough, 24 (6) from diphtheria, 41 (2) from diarrhœa and enteritis under 2 years, and 20 (0) from influenza. The figures in parentheses are those for London itself.

Bristol reported 1 death from an enteric fever. There were 3 fatal cases of diphtheria at Liverpool.

The number of stillbirths notified during the week was 164 (corresponding to a rate of 32 per thousand total births), including 13 in London.

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In England Now

A Running Commentary by Peripatetic Correspondents

IF the G.P. of the future is not to be a martyr to writer's cramp, ambidexterity must be forthwith introduced into the curriculum. Certificate-writing has a great future. At present it is only in its infancy and probably does not occupy more than a quarter of the doctor's working day. I don't think that I am ever called on to sign more than 35 different kinds of certificate. Let's have them all in during one surgery hour (as well we may) and tot them up. First, then, we have A, a farmhand with an infected toe. That's easy. Obviously he can't work till his toe is better, so I give him a weekly panel certificate. In totters old B with paralysis agitans. He gets a pink certificate, so that I don't have to write another one for him for a whole month. Ah, wait a bit—he belongs to two private clubs which pay him a few shillings and he might as well have them, so I sign them for him. Total so far, 3. Mrs. C brings in her little boy with a cough. He is, she tells me, on the natural deposit and produces the appropriate form—only diagnosis and initials to be written on that one. Her husband has also looked in because he has broken his plate, so he gets a certificate stating that he requires dental treatment. In comes Miss D; she gets headaches, worse after sewing or reading, and she thinks, quite rightly, that she needs glasses. I give her an ophthalmic certificate and call for the next patient. It is Mr. E, big, fat and elderly, to say that his truss is almost wear'd out and he needs a new one. I give him a certificate for a surgical appliance and mop my brow. Total to date, 7. Mrs. F. has sent up her little girl with a certificate claiming maternity benefit. The nurse could have signed this, but Mrs. F forgot to ask her when she was attending, so perhaps the doctor will oblige. He does. Oh, and Mrs. F wants an extra milk certificate for nursing mothers; and Auntie, who is expecting, wants one too—10 up. The wife of a sailor wants a form signed so that she can draw her separation allowance; she is followed by the wife of a soldier and the wife of an airman in similar circumstances. Total, 13. Old Mrs. G and her widowed daughter, Mrs. H, come in together. Mrs. G wants her O.A.P. paper signed and Mrs. H one for the widows' pension. A J.P., lawyer, minister of religion or other responsible person could sign these, but the doctor is unfortunately so much more accessible than other responsible persons. Hello, here comes young I, the telegraph boy, with an almost invisible dog-bite. There is a regular questionnaire to fill in about this, but it is done at last and I makes way for his father, a postman, with lumbago. He can't work with lumbago, poor chap, so I give him a post-office certificate. 17. Mrs. J's husband is a diabetic so needs a certificate for the food office; and could she have a certificate so that she may get glucose for the baby? You know how he needs glucose, doctor. And you said little Charlie wasn't to go back to school till his throat was quite better—well, the school attendance officer keeps badgering her, so could she have a note to show him No. I dig in my toes. If the school attendance officer won't take her word for it that little Charlie is under the doctor, let him come and see me. That settles the school attendance officer and gets me out of writing one more certificate. Mr. K is still far from right in his stomach in spite of the operation which I said would cure it. I didn't, but agree that he should have extra milk and write a certificate accordingly—20 up. Miss L is a nice, bright girl and won't keep me a minute. Just sign this to say that she is fit for work in the NAAFI. I examine her, answer the questions and sign. Mr. M is going to work in the dockyard and has a special form for me to fill in and sign—I examine him and do so. At this point the relieving officer creates a diversion by looking in to say that old Miss N who was always a little odd, has identified herself with Hitler, and, in a state of nature, is haranguing the delighted multitude from an upstairs window. I slip out and certify her. Back again, I find Mr. O in great distress. He lost both legs in the last war, has mitral stenosis and has been called up. The man at the labour exchange agrees that Mr. O is probably unfit for national service but must just have a line to that effect from his doctor. Mr. P really does not take long. He is recovering as quickly as he can from a number of bomb wounds and blast effects, but has to have a weekly certificate of unfitness to work. It's all a lot of red tape, he says, but I rebuke such levity. Mrs. Q says that my partner has ordered her daughter to go under the X rays in hospital and she has brought the hospital-aid form for me to sign. Mrs. R's old father has passed away at last. We agree that it's a merciful release for all three of us. Even in death he is a nuisance, requiring not only a death-certificate but a cremation-certificate as well. 28. Only two more patients I see. Here's Mr. S who has been pulling turnips and got a tenosynovitis; that means an industrial diseases certificate. And Mr. T has been knocked over by a car. He isn't badly hurt, but I must fill in a road-accident form. Apart from sending off a throat swab, a sputum, a blood for W.R., a specimen of urine and a request for an X-ray report, all of which require certificates, that seems to be all. Yes, I make it 35 kinds. When I get home, if ever, I can fill in the antenatal examination, emergency midwifery and vaccination forms and write letters to the county council recommending children for T's and A's.

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It is not altogether surprising that from time to time the less sensational elements of the lay press look with a tinge of suspicion at successive blasts of semi-official eulogy in praise of this or that source of vitamins. It may sometimes appear that the changes are rung a trifle freely on the virtues of many things as they happen to hang heavily on the official hands—sometimes carrots, sometimes rose-hips. We have recently succumbed to the rose-hip propaganda, and have organised expeditions of our nursing staff into the country lanes in search of berries, "vivid red and slightly soft" to quote the official instructions. There is no dearth of volunteers for these outings, despite the fact that the collection of rose hips is known to be prickly, devastating in its effects on stockings and sometimes rather dirty. By way of compensation, it involves a not-too-smooth ride a few miles into the countryside, a picnic forenoon and a departure from everyday routine. Raiment of ancient vintage is pulled from obscurity, and the party sets out in a gay spirit of adventure, though scarcely, perhaps, a very fashionable gathering. The instructions for picking are explicit enough. The fruit is not to be bruised or in any way damaged, and the berries brought back as soon as possible after picking in suitable containers—"baskets, not tins."

Back at the hospital the work of extraction begins. The hips are placed in a pan, covered with water and subsequently mashed with a wooden spoon, and the mass squeezed through a jelly bag to obtain the juice, care being taken to filter out the sharp, stiff hairs on account of their reputed capacity to produce gastric irritation. Our instructions were that the fruit should be boiled for about a quarter of an hour until tender, which seemed a little odd in view of the known properties of vitamin C; and we found when we tested the vitamin content of brew prepared in this way that the prescribed boiling for a quarter of an hour was highly prejudicial to vitamin-C content, reducing it to about a third of what it had been at the boiling point. On the other hand, nothing short of boiling succeeded in extracting any considerable quantity of vitamin from the fruit, so that we were driven to compromise by slow raising to the boiling point, with discontinuance of heating as soon as that was reached. We were able in this way to obtain an extract of fairly stable vitamin content, though it fell considerably short of the impressive figures issued with the official instructions. From the juice we prepared a syrup by the simple addition of sugar, and hope piously that the resultant product will keep with us for a period of three months. We estimate that it will be necessary to take 3 oz. of the syrup daily to produce any appreciable effect.

The next problem was to determine how best it could be used. In our early enthusiasm we had hoped to carry out something in the nature of a controlled experiment that would enable us to record any improvement in health among the rose-hip takers, but we soon found that an experiment of this sort on any worth-while scale was out of the question, and we had to content ourselves with the selection of a score of nurses who seemed to experience habitually more than their share of the ills of this world. These unhappy people were singled out as experimental

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animals and elaborate precautions taken to ensure that they duly consumed the syrup. Whether it will do them any good we are not yet in a position to say; it can scarcely do them much harm, unless some of the "sharp, stiff hairs" have eluded us. But, almost irrespective of the outcome, we have come to the conclusion that the game is scarcely worth the candle and that the chief virtue of our essay in rose-hip extraction lies in its significance as a gesture of benevolent interest. We have had much the same feeling about the outcome of our attempts to grow oats and potatoes; but in war-time we do, with the official blessing, many curious things. Rose-hip jelly as a jelly may be quite good, even appetising, but the treatment of rose-hips on the domestic hearth as a source of vitamin C seems to be rather an overrated amusement.

* * *

After several false starts traceable to the water-pipes or to the singing of high-spirited colleagues and military policemen Wailing Willie really got going the other night, warning us of the unpleasant proximity of Hitler's young friends. Our siren is no ordinary one. Its voice is well and truly broken and in full cry resembles a byre at milking time or the ear, nose and throat ward on tonsil morning. Like the heating system its efficiency depends on the steam pressure and varies accordingly. When the fires are banked up well and there is no other claim on its motive power its roaring is echoed and re-echoed from the hills like the wail of the last of the banshees, but on one famous night when the fireman had fallen asleep and let the furnace go down all that Willie could do was to give an apologetic gurgle such as follows removing the stopper from a bottle of flat ginger beer. As ill luck would have it that very night the all-clear came within five minutes and the raiders-past signal lacked its usual triumphant ring.

The garb in which the various members of the staff parade on such occasions is to me a never-ending source of interest and amusement. I myself am sufficiently hidebound in the fetters of convention to regard the absence of a collar and tie as the last infirmity of noble mind and dress accordingly. Such opinions are not held by my colleagues. The Physician, as all good physicians should, upholds similar ideals to my own but the very fountain head of orders has been known to appear wearing a lounge suit on top of his pyjamas; in extenuation, however, it must be said that the occasion in question was the third of three successive nights. Some version of engineers' dungarees which our female friends assure us is termed a shelter-suit seems to be favoured by the junior members of the medical staff of that sex and I have found it in my heart to envy them when searching half asleep for a lost collar-stud at two in the morning. The nursing staff, however, are allowed no such easily put on garment, but they are probably well used to dressing in the earlier stages of coma at 6.30 A.M. and little deserving of our sympathy. They at least can put a cap over their curlers when rudely awakened, but the mere male who appears with untidy hair is frowned on by all alike.

The wail of Willie is the signal for action stations for the fire-watching parties, who proceed armed with stirrup pump and sand to their appropriate places. The selection of one's appropriate locus is not as simple as it sounds since our firemaster, one Sir Thomas Tucker, erstwhile leading light of the brigade in a provincial town, has an engaging habit of changing this about once a week without notice. He has even been known to go off on holiday and take his beloved stirrup pumps with him for a change of air. It is true he left us the hoses but according to his own teaching these are an invention of the devil only to be used by experts (for which read "himself"). Despite these interesting diversions it is always with a grievance that I leave my warm and comfortable bed to watch for incendiaries which never fall or to shelter from high explosive dropped fifty miles away.

MESSRS. T. J. SMITH and NEPHEW have issued a second edition of their booklet "The Preparation of Plaster Casts," which includes patterns and directions for a spinal jacket in addition to the six plasters described in the first edition. The booklet can be obtained free of charge, and a set of master patterns made of stiff paper is supplied with the first order for wide "Cellona" material.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

ON Nov. 11 Parliament was prorogued. It was, to quote Hansard, "End of the Sixth Session (opened 21st November 1940) of the Thirty-Seventh Parliament of the United Kingdom of Great Britain and Northern Ireland in the Fifth Year of the Reign of His Majesty King George the Sixth." But it was only a winding up on Nov. 11 in order to open a new session on Nov. 12, so the Speaker suggested that the custom of all members filing past him, shaking his hand and bidding him farewell, should be dropped. "On this occasion I bid you farewell from this place and hope soon to meet again."

The King's speech on the prorogation of Parliament referred to the Atlantic Charter as "a beacon in history radiating resolution, justice and unselfish purpose" and to conferences with the prime ministers of Canada, Australia, New Zealand and South Africa. The King's speech on the opening of the new session on Nov. 12 referred to consideration of "the urgent problems which will face them when the nations now enduring the tyranny of the oppressor have regained their freedom" and further welcomed the restoration of the Emperor of Ethiopia to his throne as the first country to be liberated and re-established.

The content of these two statements of policy do not satisfy the House of Commons. There is a widespread feeling that changes in policy are required—with regard to production for war purposes, with regard to the direction of our military efforts, with regard to interference with individual liberty centring round the use of the powers of Defence Regulation 18B, with regard to the allowances of wives, children and other dependants of men in the forces. All members support the war effort of the Government but many think it should be intensified and that it should take cognisance of those larger issues of political and economic change that loom in men's minds in prefigurement of the future. Sir Richard Acland, the wealthy landowner who is serving in the ranks in an Army Unit, emphasised these larger issues. Contrasting this war and the last he said, "In this war there is a positive and passionate longing on the part of the overwhelming majority of the people not to go back to the miserable world which they knew in 1939. We want to move on to a new way of living where the motive of service will transcend the motive of individual gain." Acland referred to a meeting he had had with a very "tough set of successful business men" who all wanted "a Britain without property owners" and ended by what was in effect an appeal to Winston Churchill to take the lead in a complete renewal of Great Britain's economic and social structure.

* * *

Major E. E. Gates, in a well-delivered maiden speech dealing with the anomaly of the difference in pay between the services and industrial workers, ended, "Unless the Prime Minister devotes himself closely and immediately to our pressing domestic problems with the same brilliancy that he has so far devoted to the grand strategy the war may be lost in these islands."

Mr. Austin Hopkinson said this war was "really Armageddon" and that it would from the biological point of view decide the future progress of the human race. He regarded the present war as the climax of human history and as embodying the conflict of principles which had been perceived clearly for 3000 years. "In one country after another, in Northern India, in Greece and finally in Palestine one man after another has arisen and said that the whole human race is going to ruin—and that until men really believe, and act upon the belief, that it is better to give than to receive, there is no hope whatsoever for the future of humanity."

* * *

Mr. D. N. Pritt, K.C., criticised the continued presence in the Government of men who were "extremely lukewarm" towards our alliance with the U.S.S.R. Mr. Shinwell reaffirmed the essential unity of the nation and our determination to effect the speedy destruction of Hitlerism but made a powerful and sustained criticism

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of Government policy urging better organisation and more speed in work. "The essence of victory lies in speed, in audacity, in taking risks, and in dauntless courage. Unless the Government can supply these virtues, they will, in the opinion of the country, have outstayed their welcome." Mr. Lloyd George went over to Shinwell after the speech and congratulated him—Conservative, Liberal and Labour M.P.s did so too. Mr. A. V. Alexander's reply to the debate in which he dealt largely with Shinwell was on lines of personal attack and produced a bad impression on the House and he passed over the big questions raised by other members without remark.

* * *

The Prime Minister had stated earlier in the day that a full debate on the address might, if desired, extend over 2 or 3 weeks. Parliament is awake and a succession of debates on big issues of policy is certain. Mr. Churchill does not now propose to make any changes in membership of the Government.

Obituary

HUGH MORELAND McCREA

O.B.E., M.D. R.U.I.

BY the death of Hugh Moreland McCrea a very remarkable man is lost to our profession. The qualities in the aggregate required to make a great clinical physician are much more rare than those needed to make a great surgeon, for the problems presented to the latter are solvable chiefly by touch, sight and personal dexterity, whereas those with which the physician has to cope require, not only the piecing together in order of importance of a number of data obtained from various sources, but the correct deduction from the whole assemblage.

Vandyk

The power of doing this varies with individuals, but from time to time men appear who, possessing a faculty for retrieving and marshalling in surprising context impressions latent in subconsciousness, have it in remarkable degree. The term *flair* is commonly used to describe this faculty and McCrea was one of those gifted persons. To the gift was added an insatiable zest for professional knowledge which was continually added to by acute observation and voluminous reading. The result was a many-sided physician without one weak facet, so that whatever the nature of the case he brought to it the ability of an expert on that particular malady. He was at first in general practice, surely the best of all preliminary schools for a career of pure medicine; but, like certain other great physicians who began that way, the call to consulting work at last assumed imperative proportions. His outstanding professional qualities became so widely recognised that he may justly be termed the consultant's physician, so many of them were numbered amongst his patients.

His energy and kindness matched his abilities, for he threw his whole heart into every case, great or small, to which he was called and a multitude is in his debt. His passing enhances a regret, often felt before, that he was never on the staff of a teaching hospital where the high ideals and deep mine of clinical lore of which he stood possessed could have been passed on to the younger men coming after him. Amongst those of us who knew him he will always be remembered as a beloved physician and an unfailing help in time of trouble. V. B.

McCrea was born in 1877 at Belfast, where his father was a medical man of considerable distinction and his maternal grandfather was Dr. R. Dill, professor of midwifery at Queen's College. He was at school at the Royal Academical Institution before entering Queen's University on a science scholarship. He took the Malcolm exhibition and the Coulter clinical scholarship, qualified M.B. in 1901 and for two years held resident appointments at the Royal Victoria Hospital. In 1903 he settled in general practice at Wargrave, whence he moved to London four years later. He combined a rare acumen with a profound knowledge of modern tendencies and of the various branches of medicine. He was specially familiar with the many problems which ophthalmology presents to the practitioner of medicine and the ophthalmoscope revealed much to him which would have been hidden to many. He was for long on the outpatient staff of the Paddington Green Children's Hospital and during the last war acted as senior physician to the City of London Military Hospital. He became chairman of the Final Medical Appeal Board and he organised the emergency medical corps under the auspices of the Royal Society of Medicine. For these services he was made O.B.E.

The idea of forming a vast private hospital where private patients would have at their service the same advantages as those enjoyed by patients in the voluntary hospitals early took root in his mind and soon after the war finished he set about, with indomitable energy, to realise his dream. The result was the London Clinic of which he was the originator and principal promoter. When in the years to come such institutions have grown up in all the great centres of population, working either independently or in association with the voluntary hospitals, it should be remembered that McCrea pioneered the way.

For some time his health had given rise to anxiety but the end came on Nov. 8 with unexpected suddenness. He married Kate Rose, daughter of Charles Hannen of the Chinese Customs, and leaves his widow with two daughters.

MILLICE CULPIN

L.R.C.P.E.

Dr. Millice Culpin, who died at Brisbane on Sept. 1 at the age of 95, was Queensland's oldest doctor. He was born in this country and began his schooldays at Alleynes Grammar School, Stevenage, shortly before the outbreak of the Crimean war. He qualified L.S.A. from the London Hospital in 1877 and took the Scottish conjoint qualification five years later. He set up in practice in Brisbane over sixty years ago and soon all his interests were centred in his new home; except for one holiday many years ago he never returned to England. He represented Brisbane in the federal parliament from 1903 to 1906, but public life was to him a duty, faithfully performed, and his real interests were his work, his books and chess. He was also a member of the Rationalist Society of Queensland. Dr. Culpin leaves three daughters, and his two surviving sons are both members of the medical profession—Prof. Millais Culpin of London and Mr. Ernest Culpin of Brisbane.

TRAINING THE LUFTWAFFE DOCTOR.—The medical officer of the Luftwaffe seems to be a true son of the winged Hermes, for he is trained to be both doctor and flier (*Dtsch. med. Wschr.* Sept. 12, 1941, p. 1018). After taking his Abitur—which is the equivalent of our matric—the candidate does six months' military training before joining the medical academy of the Luftwaffe, which is at present housed in a suburb of Berlin. Here he is taught the principles of aviation and at the same time begins his medical studies. But his military training also continues, and is considered an important part of his curriculum, for in spite of the Geneva convention the German medical officer "often has purely military tasks of leadership to fulfil." So that he may lead medical flying units and cope with the problems of aviation medicine and flying in high altitudes the student must himself learn to fly gliders and planes, and he must be able to manage not only the larger types of aircraft used for the transport of casualties but also the smaller makes such as the "Storch" and "Weihe," for they have the advantage of being able to land in a confined space. He is also taught to use a parachute, for if he joins a company of paratroops he must be able to jump with his men. Institutes for research in aviation medicine have been set up in Hamburg, Freiburg-i-Br., Jüterbog and Berlin.

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Letters to the Editor

WORKING HOURS

SIR,—In September, 1915, Mr. Lloyd George, then minister of munitions, appointed a Health of Munition Workers Committee, "to consider and advise on the question of industrial fatigue, hours of labour and other matters affecting the physical health and physical efficiency of workers in Munition factories and workshops." The committee recognised that if men are asked to work for fifteen hours a day for weeks and months on end, as was the case in 1916, one of two results must follow: either the health of the workers will break down or they will not work at full pressure. In either case output must suffer. The committee made the provisional recommendation that hours of work for men should not exceed 65–67 per week; for women and girls 60, with no night work for girls under eighteen; and for boys under sixteen, 60 hours with no night work. In 1917 the committee stated that they were convinced that the maximum limits of weekly employment provisionally suggested were too high except for quite short periods and that the time was then ripe for a further reduction in the hours of work. They were satisfied that reduction could be made with benefit to health and without injury to output.

It is some 120 years since Robert Owen ran his New Lanark Mills for only 10½ hours a day instead of the usual 15–16 and found that output did not sensibly fall below its previous level, while there was marked improvement in the cheerfulness of the operatives and in their vigour. The events of the last war demonstrated beyond question that there was a point beyond which it was folly to extend hours of employment and that that point was much lower than had been accepted previously. Subsequent work carried out under the auspices of the Industrial Health Research Board has all pointed in the same direction. Vernon in his book "The Health and Efficiency of Munition Workers" suggested that the optimum working hours for women are between 48–54 per week, and girls under 18 should not be required to work more than 48 hours per week. It is only after two years of war that these well-established principles have received some measure of official sanction. The Government comment on a recommendation in the 25th report of the Select Committee on National Expenditure, issued recently, recognised that investigations by the Industrial Health Research Board have established that, over an extended period, weekly work hours should not exceed 60 for men and 55 for women, and the Government is satisfied that it is more useful to restrict weekly hours now within the limits mentioned than to make further investigations. It is officially agreed that, to maintain maximum production, Sunday work should be abolished in industry, except to meet the most compelling emergency and except in those plants where workers have a break of at least 24 hours per week under a rota or relief system.

It is a matter for profound regret that it has taken so long to relearn such an essential lesson of the last war, and it is to be hoped that never again will there be a temptation to succumb to some of the follies in this matter of working hours that have been perpetrated during the last two years.

DUNS SCOTUS.

PNEUMOCOCCAL MENINGITIS

SIR,—So many reports of the recovery of isolated cases of "pneumococcal meningitis" have now been made that one would gain an impression that the outlook had very materially altered since sulphapyridine was introduced. I am sure there must be many clinicians like myself who feel that this scarcely reflects the true state of affairs, and who are therefore grateful to Dr. Cooke for his significant paper in THE LANCET of Nov. 1.

There are two observations I would like to make on your annotation of Nov. 8. When assessing the results of treatment is it satisfactory to lump all cases under the generic term of pneumococcal meningitis? My own experience leads me to subdivide those cases into three groups. First the *septicæmic case* where meningitis is a late, often terminal, complication of a pneumococcal infection distant from the meninges; second, the *invasive case* where meningitis is a result of local spread from a focus of infection close to the meninges; and third, the *traumatic case* where the infection is caused by the passage of organisms from the nose or throat through a breach of bone (this last including the postoperative case). Such a subdivision has, I think, considerable importance in relation to chemotherapy. Septicæmic cases occur even during the course of sulphonamide therapy, and presumably this indicates that either the organism is insusceptible to the drug or the patient is unable to utilise it; the fatality-rate in this group is still high. In the invasive case sulphonamide therapy may, for the time, discourage further invasion, but will almost certainly not eradicate the primary focus, for which surgery will still be required if recurrence of the meningitis is to be prevented. In the traumatic case, however, sulphonamides may be expected to show optimal results, for the organism is here probably of low virulence and its invasiveness may therefore be promptly checked. The clinician's assessment of the value of chemotherapy will thus depend on the kind of case he is called on to treat.

My second point is to ask for the evidence which supports the statement that type III is the "most common single type in this infection." I cannot recollect having seen a single type III infection of the meninges. My earlier records are unfortunately not readily available, but I have seen twelve cases since 1938 in which the types were: II (4), V (1), VI (2), VII (1), XIII (1), XXIII (2) and one where the pneumococcus did not agglutinate with any of Cooper's 32 types. None of these cases recovered despite the administration of sulphapyridine. Only three of them did not belong to the septicæmic group. The type VI was caused by an antral infection, while the type XIII was secondary to a mastoiditis. There was no apparent primary focus in the case from which the untypable strain was obtained. (It is at least arguable that the comparatively rare primary pneumococcal meningitis should be included in the septicæmic group.) I can readily understand that type III, which is so often present normally in the nose or throat, might be most frequently encountered in the traumatic group; but I can see no reason for supposing a high incidence of this type in the septicæmic or invasive group. In these groups one would expect the type incidence to correspond to that peculiar to the district from which the cases were drawn.

Knightswood Hospital, Anniesland. THOMAS ANDERSON.

WHEN TO TIE THE CORD

SIR,—I was interested in your leading article of Nov. 8 on when to tie the cord. It always seems to be taken for granted that the baby will gain extra blood if delay is made before applying the ligature until pulsation in the cord has ceased. I suggest that this is contrary to the truth and that the baby is liable to lose blood by this delay. In any case I think the following argument is worth consideration. From the point of view of the welfare of the babies the matter is of importance. It is obvious that the only force propelling the fœtal blood-stream, and hence that part of it going to and coming from the placenta, is the fœtal heart beat. This force is of only moderate power and yet it is the only force available for the return of blood from the placenta to the fœtus. This is a great task for a comparatively weak organ to fulfil. Intermittent uterine contractions during the third stage obviously can be of little or no account in this process. Consider the work that the heart must do and the conditions prevailing. The placenta is an inert body and is, in the third stage, largely unsupported. Therefore, before any blood returns to the fœtus the placenta must fill up and form what is equivalent to a heavy lake of blood. The fœtal heart must take on the strain of overcoming the resistance of this inert and heavy lake in order to force any blood at all back to the fœtus through the umbilical vein. It is practically certain that the task is too great and that far more blood remains in the placenta than ever returns to the fœtus. Thus the fœtus will lose more and more blood the longer the flow continues to go into the placenta. But the fœtus may lose blood in another way as well. There may be a certain amount of separation of the placenta and there may thus be direct fœtal blood loss through the separated placental surface. It is true that anatomically the placenta separates from the uterus

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through maternal tissue and so it may be said that the placental surface is sealed in such a way as to prevent loss of blood through the separated placental surface. But where such a very thin covering is involved there is bound to be much tearing and it is likely that the adherence of this thin maternal remnant does little to prevent loss of fœtal blood. Personally I believe that the cord should be tied at once in order to conserve the fœtal blood-volume.

Dundee. A. E. CHISHOLM.

WHAT'S IN THE LOAF?

SIR,—Your timely leader discloses a situation nearly incredible but so obviously in accordance with the ugly facts that further action is required.

When the Medical Research Council issued their memo on national flour last spring it was understood that it contained the specification of national wheatmeal flour which we were asked to eat. Any doubts about this were dispelled when Lord Woolton, addressing the bakers at their national conference at Leicester in June, said he had been at great trouble over the bread question but had been "advised by the most eminent scientists in the country" and mentioned the Medical Research Council by name in this connexion. Everyone understood that one of the two 85% extraction flours specified in that memo was a specification of the wheatmeal bread to be introduced by the Ministry of Food. It did not matter which; the millers were for their convenience to make one of these and then pass on to the other. No other specification was issued nor any information given by the Ministry of Food casting any doubt; we knew what national flour was to be. The specification was therefore examined and found good, especially when reports were issued by various nutritional laboratories as to the B vitamins, minerals, &c. this flour could be relied on to supply. I therefore started a campaign to popularise wheatmeal bread, explaining to patients how they would thus get a generous supply of the essential B vitamin as well as four times the anæmia-preventing iron they got from white flour. How by this means the Ministry had made a cheap protective food available. That it contained even less indigestible fibre than white and would be more digestible. I was confirmed in these views when Circular 2470 was received from the Ministry of Health in June. This was sent to me in my capacity of M.O. to the local infirmary and asked me to make the new bread available to patients and staff. This circular is so illuminating that I quote one passage in full.

"The Minister has been in consultation with the Minister of Food on this matter and he is advised that national wheatmeal flour is now available to bakers. This flour contains the greater part of the germ of the wheat, with some of the finer bran, but excludes the coarser bran. It thus contains not only most of the vitamin B_1, but also most of the remainder of the vitamin-B complex, as well as valuable minerals removed in producing white flour. National wheatmeal flour is therefore of high nutritional value and is particularly valuable at times when there is restriction upon the availability of other foods from which these vitamins and minerals could be obtained."

Can anyone doubt that the flour specified by the Medical Research Council was under consideration? There was no other published, or known, and the reference to the fineness of the fibre left in is itself sufficient evidence if any were needed. You now call attention to an order of the ministry regulating what national wheatmeal flour really is to be, and which was issued only two months after the consultations between the ministries on the same subject. As you explain it this order simply makes fun of what the Minister of Health was told. Or perhaps I had better say of what he informs us he was told by the Minister of Food. Instead of containing the greater part of the germ of the wheat the flour need not contain any. Instead of containing most of the B_1 vitamin it need not contain more than white flour from which most of it has been removed. Instead of containing most of the remainder of the B complex this will be absent as will the valuable minerals. For it may be nothing more than white flour to which some bran has been added!

So all that I have been telling patients, on the word of two ministries, has been without justification. I object to being misled at any time, but particularly on a matter of such importance to us all in war-time.

It will only be fair to the M.R.C. if I state that a letter from the council informs me that the policy of the country as regards the production of white and brown bread is decided entirely by the Ministry of Food and that they have nothing to do with this; the letter concludes (italics mine): "No doubt, IF the Medical Research Council had to give advice *without taking into consideration any other body*, they would recommend 85% extraction flour with added calcium...." Compare this situation with that at the Air Ministry and ask where we should be today if Sir Archibald Sinclair had adopted the same attitude towards his scientists, and left planes to be made in ways giving most profit to manufacturers. Because can anyone doubt that financial interests have a connexion with the change of front on wheatmeal? Or is it simply the dullness shown by the previous representative of the Ministry of Food in the House of Commons who declared there "We want no scientific stunts on the Kitchen Front"? The Ministry of Food have able men who understand nutrition at their service. Why are they not being used?

All should be grateful to you for raising such a vital though unpleasant question.

Grimsby. S. W. SWINDELLS.

PERINÆAL SUTURE UNDER LOCAL ANÆSTHESIA

SIR,—In your annotation last week (p. 611) you rightly emphasise the value of repair of the perinæum under local anæsthesia and refer to a paper by B. Williams and to another by Neal Smith, the latter reporting its use with good results in 17 cases at Charing Cross Hospital. Thirteen years ago in your columns (*Lancet*, 1928, 1, 1281) I described an exactly similar method even to the insertion of the needle through the skin surface and stressing, as Dr. Smith does, the importance of infiltrating the tissues immediately under the skin or mucous membrane. The only difference between Dr. Smith's method and mine, so far as I can see, is that I advised the addition of adrenaline chloride solution (1 drop of a 1 : 1000 solution to each drachm of Novocain) and pointed out that it spared the patient any pain from insertion of the needle if a swab soaked in the solution was placed for 5 minutes beforehand against the raw surface. The method as described by me has since been in routine use by the students and staff in the obstetric unit of University College, both in the hospital and on the district, and during these 13 years it must have been used in several thousand cases. The results have been so uniformly satisfactory that no one has suggested that it should be discontinued. To my knowledge the method is now routinely and successfully used in at least three other London hospitals.

University College Hospital, W.C.1. F. J. BROWNE.

STUDENT AND SCREEN

SIR,—The comments in your issue of Nov. 8 draw attention to the neglected possibilities that lie in the film for teaching medical students. The increasing amount that has to be learnt in a limited time makes it surprising that no request for use of films has yet been made by medical students. Though academic circles in this country have hardly noticed this weapon, there are a number of good scientific films that could be more widely used in teaching—films on mathematics, physics, chemistry, biology, anatomy and physiology, and films illustrating operative technique in surgery and obstetrics. Medicine has not yet been filmed so much, though the film on malaria which you reviewed is of very high quality. There are films on subjects ranging from oxygen therapy to the treatment of war neuroses, there are health education films for children and adult audiences, and the relation of medicine to the community is illustrated in films such as the British Commercial Gas Association's excellent nutrition film "Enough to Eat," and the Ministry of Information film "Health in War."

The chief reason why a wider use has not yet been made of available films is probably ignorance either of their existence or of how to get hold of them. The Scientific Films Committee of 30, Bedford Row, W.C.1, have viewed a large number of scientific films and are continuing to do so. A list of scientific films with an independent evaluation of their merit for showing to

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expert and to general audiences and for teaching purposes has been prepared. Detailed critiques of these films and their contents are also available. The S.F.C. has arranged a number of film shows at the request of various medical societies, and also shows of health films (similar to the public health show given by the London Scientific Film Society last winter) for more general audiences. It is important that films should be used widely in the health education of the public, and a start has been made with "Defeat Diphtheria" and "Breath of Danger." The committee will be glad to give information to those who wish to know more about or to arrange shows of films of medical interest.

London, W.C.1. RONALD MACKEITH.

DISPOSAL OF STILLBORN CHILDREN

SIR,—The sequel to the story of your peripatetic correspondent, or one like it, about the fœtus in the abdomen of a man, was that the mortician rather unnecessarily reported it to the coroner. As the body had been removed some miles away from the hospital the coroner was concerned that the body should have got into his jurisdiction and did not quite know what to do about it. So he reported to the Home Office who sent one of the Big Five from Scotland Yard to see me on a Sunday morning to suggest that the mortuary keeper had been aiding and abetting the offence of concealment of birth. Of that it was shown that he was not guilty. However, the chief inspector's visit was followed by a documentary admonition to which I was able to reply that the procedure of placing a baby's body in the coffin of an adult had written authority from the Home Office, given some years before. Whereupon there was some flutter in the official dovecote. The hospital changed its procedure but the disposal of stillborn children still gives trouble.

BETA.

Appointments

ALCOCK, WILLIAM, M.B. Sheff., B.Hy. Durh., D.P.H.: M.O.H. and school M.O. for Burton-on-Trent.
COKKINIS, A. J., M.B. Lond., F.R.C.S.: V.D. specialist at Hillingdon and West Middlesex county hospitals.
COOPER, J. D., L.R.C.P.E., L.D.S.: temp. asst. M.O. at Forest Gate Hospital, West Ham.
FERRIS, R. D., M.B. Melb., F.R.C.S.E.: deputy R.S.O. at Coventry and Warwickshire Hospital.
NELSON, MARY, L.R.C.P.I.: temp. asst. T.O. for Sheffield.
POLLEY, S. F., M.R.C.S.: R.S.O. at Rugby Hospital.
SUTTON, S. J., M.R.C.S.: temp. asst. M.O., Whipps Cross Hospital, West Ham.

Colonial Service.—The following appointments are announced:
BOWYER, J. H., M.B. Dubl., D.P.H., D.T.M. & H.: superscale officer (grade A), Malaya.
SHIRCORE, J. O., M.B. Edin., M.R.C.P.E.: M.O., Nyasaland.
WAKEFIELD, T. C., M.B. Edin., L.M.: superscale officer (grade B), Malaya.

Births, Marriages and Deaths

BIRTHS

BABINGTON.—On Nov. 12, at Leicester, the wife of Major G. C. Babington, R.A.M.C.—a son.
CLARKSON.—On Nov. 11, at Witney, Oxon, the wife of Major Patrick Wensley Clarkson, R.A.M.C.—a son.
HAGENBACH.—On Nov. 8, at Bath, the wife of Dr. Charles Hagenbach—a daughter.
HAYWARD-BUTT.—On Nov. 11, at Crail, Fife, the wife of Surgeon-Lieutenant Peter Hayward-Butt, R.N.—a son.
KEKWICK.—On Nov. 13, at Mursley, Bletchley, Bucks, the wife of Major Alan Kekwick, R.A.M.C.—a son.
LEISHMAN.—On Nov. 14, 1941, at Alresford, Hants, the wife of Dr. Hugh Leishman—a son.

MARRIAGES

WILKIE—DUFFY.—On Nov. 29, at Upminster, Essex, Duncan Richard Primrose Wilkie, M.R.C.S., captain R.A.M.C., to Mary Duffy, S.R.N.

DEATHS

GOLLAND.—On Nov. 14, Alfred Golland, M.R.C.S., of Holly Mount, Bosbury.
GRAHAM.—On Nov. 11, at Edinburgh, Frederick Maurice Graham, M.D. Durh., F.R.C.S., chevalier de la Légion d'Honneur.
MORRIS.—On Nov. 11, at Bognor Regis, Henry Cecil Low Morris, M.D. Brux., M.R.C.S.
WRAITH.—On Nov. 13, Oswald Samuel Wraith, M.D., F.R.C.S.E., of Bournemouth, aged 83.

In a recent casualty list W. S./Captain L. Maclean, R.A.M.C., was posted as a prisoner of war.

Medical News

Royal College of Surgeons of England

At a meeting of the council held on Nov. 13, with Sir Alfred Webb-Johnson, the president, in the chair, the following were re-elected members of the court of examiners for one year from Dec. 11: Mr. R. Milne, Mr. R. Davies-Colley, Mr. G. T. Mullally, Mr. V. Z. Cope, Mr. C. E. Shattock and Mr. E. W. Riches.

Diplomas of membership and public health were granted (with the exception of F.-X. Darne, J. D. C. Gowans, D. K. Sambrook, A. L. H. Smith, and Glenys Wade) to the candidates named in the report of the comitia of the Royal College of Physicians in THE LANCET of Nov. 8, p. 585. Licences in dental surgery were granted to the following:—

Denis Abraham, J. E. L. Armitage, Barbara M. Barnes, Rolf Bergmann, R. D. Bookless, N. A. Bostock, J. A. Boyd, B. G. Brown, A. E. Cadman, M. F. Caton, Philip Cohen, R. F. Cutmore, C. I. De Silva, A. W. Donald, John Dunnett, W. J. Ford, J. H. Forrester, R. M. Gillies, A. P. Gimson, A. E. G. Goodfellow, F. L. Hall, T. J. Hancock, M. H. Holmes, Eric Horne, J. P. Howes, A. V. Hurst, M. A. Kettle, D. E. Laurie, J. F. K. Leggett, T. A. Lock, John Morris-Wilson, Esther M. Myers, A. B. Nahaboo, D. A. T. Payne, W. L. Renouf, Gwendolen M. Rodgers, Allan Ross, D. F. Soul, Pauline Stacey, Henry Stooke, R. V. Tait, J. R. H. Williams, J. T. Willmott, H. J. W. Wilmshurst and F. M. Wood.

Society of Apothecaries of London

The following candidates, having completed the final examination, have been granted the diploma of the society entitling them to practise medicine, surgery and midwifery: G. M. Pearson, Guy's; J. S. Taylor, Leeds; H. A. Worthy, Sheff.; and S. S. Zoha, Osmania and N.E. Lond. Post.-Grad. Hosp.

University of Wales

At recent examinations for the degrees of M.B., B.Ch. A. A. Edwards satisfied the examiners in the subject of medicine.

University of Sheffield

The following appointments have been made: medical tutors, Dr. H. P. Brody and Dr. J. Pemberton; surgical tutors, Mr. A. W. Fawcett and Mr. H. Blacow Yates; obstetrical tutor, Dr. W. J. McCord; hon. lecturer in applied anatomy, Mr. J. T. Chesterman; and research assistant to the department of pathology and to the cancer research laboratories: Dr. M. J. Pivawer.

The following external examiners were appointed in the faculty of medicine: anatomy, Prof. R. D. Lockhart; physiology, Prof. R. J. S. McDowall; medicine and therapeutics, Prof. L. G. Parsons; pathology and bacteriology, Prof. S. L. Baker; obstetrics and gynæcology, Prof. A. L. Robinson; forensic medicine, Prof. Sydney Smith; pharmacology, Prof. W. J. Dilling; and public health, Dr. J. A. Charles.

The following were appointed representatives on the committee of management of Sheffield Hospitals Council: The junior pro-chancellor, the vice-chancellor, Mr. H. J. W. Marsh, Prof. H. N. Green, M.D., and Prof. E. J. Wayne, F.R.C.P.

Royal Society of Medicine

On Monday, Nov. 24, at 2 P.M., Surgeon Lieut.-Commander John Bunyan, L.D.S., will read a paper to the section of odontology on the treatment of mouth infections with particular reference to the use of electrolytic sodium hypochlorite. On Nov. 27, at 2.30 P.M., at the section of urology Mr. Clifford Morson, Mr. Charles Wells and Mr. Hugh Barry will open a discussion on rupture of the urethra and its treatment. On Nov. 28, at 2.30 P.M., the section of disease in children will discuss the effects of war-time rationing on child health, and the openers will be Miss E. M. Widdowson, Ph.D., Dr. Dagmar Wilson and Dr. W. W. Payne. At 3 P.M., on the same day, at the section of epidemiology and state medicine, Dr. Melville Mackenzie will read a paper on the control of louse-borne typhus and Dr. G. M. Findlay and Prof. P. A. Buxton will also speak.

Vitamins for Babies

From Dec. 8, the Ministry of Food in coöperation with the Ministry of Health will distribute fruit juices and a cod-liver oil compound to all children born after Jan. 1, 1940. The first issue of fruit will be blackcurrant syrup or puree but later concentrated orange juice from America will be available. The ration will ensure an adequate intake of vitamins C, A and D to some 1,360,000 children. Distribution will be made through maternity and child-welfare centres and food offices.

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Medical Society of London

A meeting of this society will be held at 11, Chandos Street, W.1, on Nov. 24 at 3.30 P.M., when Dr. John Parkinson will read a paper on heart attacks, Mr. V. E. Negus on congenital shortening of the œsophagus, and Mr. Guy Blackburn on regional ileitis.

Royal Medico-Psychological Association

A meeting of this association will be held on Nov. 26, at 11, Chandos Street, London, W.1, at 2.15 P.M., when Dr. E. Lilian Hutton will read a paper on the investigation of personality in patients treated by prefrontal leucotomy.

Biochemical Society

A meeting of this society will be held at the Courtauld Institute, Middlesex Hospital, London, W.1, on Saturday, Nov. 29, at 11 A.M., when Dr. G. M. Findlay will open a discussion on the modes of action of chemotherapeutic agents.

Medico-Legal Society

A meeting of this society will be held at 26, Portland Place, London, W.1, on Thursday, Nov. 27, at 4 P.M., when Dr. H. Neville Stafford will read a paper on the coroner and civilian war deaths.

Socialist Medical Association

At a meeting of this society on Saturday, Nov. 22, at 12, Great Newport Street, London, W.C.2, at 2.30 P.M., Sir Albert Howard and Mr. Frederick Ridley, F.R.C.S., will speak on agriculture and health.

War Wounds Committee in Scotland

The Medical Research Council has set up in Scotland a subcommittee of their war wounds committee. The members are Prof. J. R. Learmonth (chairman), Dr. A. B. Wallace (secretary), Prof. J. S. Young, Prof. R. C. Alexander, Prof. D. F. Cappell, Prof. C. F. W. Illingworth, Prof. C. H. Browning, Dr. D. P. Cuthbertson, Sir John Fraser, Prof. T. J. Mackie, Mr. C. P. Stewart, Ph.D. and Dr. J. M. Johnston.

Domestic Staff in Hospitals

In recognition of the national importance of domestic work in hospitals the Minister of Health has decided to issue a badge to all those employed on domestic work in hospitals, who give at least 96 hours regular service each month. Women who are whole-time hospital helpers on registration will not be called for interview.

Calls to the Bar

On Nov. 17 the following were called to the bar: Lieut.-Colonel Ralph Brooke, F.R.C.S., R.A.M.C. (Inner Temple); Dr. F. H. Blackburn and Mr. E. A. Butterworth, F.R.C.S. (Middle Temple); and Dr. A. P. Cogswell (Gray's Inn).

Control of Scabies

The Minister of Health has issued a new regulation giving medical officers of health authority to inspect premises in which verminous people have been accommodated and to examine and treat other people on those premises. They may also order the cleansing or destruction of articles on the premises.

International Hospital Association

At 2 P.M. on Nov. 25 at B.M.A. House, Tavistock Square, W.C.1, the United Kingdom council of this association will hold a conference to discuss the position of hospitals in the post-war world. Prof. A. T. Jurasz, dean of the Polish medical faculty in the University of Edinburgh, will read a paper on the international position of hospitals after victory and the coming of peace. Representatives of 54 countries have been invited to attend, and the Minister of Health will be present. Admission will be by special ticket only, and further information may be obtained from the hon. secretary, 17, Bloomsbury Square, London, W.C.1.

Anglo-Soviet Medical Committee

The aims of this committee are to form a liaison between the medical professions of Great Britain and the U.S.S.R., to exchange the latest clinical and scientific knowledge, to facilitate visits of medical specialists between the two countries, and to give specialist advice on medical aid to the U.S.S.R. It is proposed to make the minimum annual subscription for associate members 5s. A bulletin on the committee's work will be issued from time to time and a general meeting will be held early in the new year. Those who wish to become associate members should write to the hon. secretary of the committee, 1, Wimpole Street, London, W.1.

Notes, Comments and Abstracts

HOME VISITING OF DEFAULTING VENEREAL-DISEASE PATIENTS

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MEDICAL OFFICER OF HEALTH, CITY OF SALFORD

A NOTE of a year's working of a scheme of home visiting of defaulting female patients who had attended a venereal-diseases clinic may be worthy of record. Only women and children were followed up; these consisted of female patients who had defaulted in attendance at the venereal-diseases clinic of the county borough of Barnsley and some special cases referred thereto. All the defaulters (some of whom had not been seen for some years) had received several invitations by letter to attend, and up to the time of the visit all these letter-invitations had proved ineffective. It is considered that the number who would have returned to the clinic without a visit would have been negligible.

The home visiting was carried out by a health visitor who also acted as a part-time nurse in the venereal-disease clinic, and part-time health visitor in the maternity and child-welfare service. An advantage was that the visitor was not "known" to patients or public as a venereal-disease visitor. Additionally, her position enabled close liaison to be maintained between other health visitors and medical officers of the maternity and child-welfare and school medical services. The visiting—which was done with the aid of a car—occupied time equivalent to one session only per week; thus, for the year's working, the number of sessions occupied in home visiting was under 50.

In all, 163 persons were visited. The medical diagnoses on the case-sheets of the persons visited were: syphilis or ? syphilis, 105; gonorrhœa or ? gonorrhœa, 38; non-venereal disease, 20. The total number of visits paid was 305: 92 persons were visited once; 28 persons twice; 23 persons three times; 15 persons four times; 3 persons five times; 1 person six times; and 1 person seven times. Of the 163 persons, it was found that 26 had removed and 3 had died, leaving a net total of 134. Of these, over a third (i.e. 50, or 37% of the total) attended regularly, while another 16 attended more or less regularly.

On visiting several clinics throughout this country, I was impressed by the fact that some of the most dangerous types of patients from an infective point of view are young people who default after a few attendances—this despite the fact that the patients were handled with the greatest tact and efficiency. In each case, verbal promise had been obtained to continue attendance until cured. It is always easy to elicit promises in the clinic. Follow-up letters had proved of no value.

In addition to the problem of defaulting, the problem of untraced contacts is serious—only 10% of the wives or partners of infected patients on an average were traced. These facts are full of danger to the public health, and make consideration of the help which home visiting can give more urgent.

Figures quoted in the excellent booklet of the British Social Hygiene Council, "Notes on Social Service in the Treatment Centre," are very striking. At St. Mary's Hospital, Paddington, the proportion of defaulters in the total number of patients is now as low as 6%, owing in large measure to the work of the almoner, described in Miss Dorothy Manchée's book "Social Service in the Clinic for Venereal Diseases" (London, 1938). At Guy's Hospital, the percentage of defaulters who were induced to return rose in six years from 46% to 80%. At the corporation V.D. department in Edinburgh, among the women and children patients, 9 out of every 10 defaulters were persuaded by the nurse's visits to return and continue treatment. In 1921–22, before the appointment of a nurse-almoner, the defaulter rate was 54%; in 1937 it was 8·5%.

The appointment of a fully trained almoner of the right personality is undoubtedly ideal, but many clinics are too small for the whole-time employment of an almoner, and there are not sufficient trained almoners to go round. The task of persuading committees to make

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such an appointment is not easy, and it was with this in mind that I deemed it wise to proceed cautiously and utilise the services of a member of the health-visiting staff in the scheme described. When the good results of such visiting are proved it will be simpler to persuade an authority to go ahead with the appointment of an almoner, or to join a group of authorities and thus to justify a whole-time appointment. In dealing with so difficult a disease as venereal disease, which has social, psychological and moral complications and legal snags, it is essential to select a nurse of the right personality, discretion and power of persuading patients. In nursing staffs of large health departments there is sure to be one or more who fulfils these conditions, and thereby a start can be made in this valuable work.

VALUE OF HOME VISITING

It is claimed that the results of this small scheme are sufficient justification for the venture and the expense involved. To get over a third of the defaulters to attend regularly is of decided value, but the results cannot be assessed merely by statistics. Two individual cases are worthy of description.

CASE 1.—A girl, aged 16, with acute gonorrhœa. This acutely infectious case, living under bad home conditions, defaulted before completing treatment. The visitor got to know her patient, and the mother's opposition melted before a simple explanation of the function of a special treatment centre. The patient was persuaded to attend. Again she defaulted. Further visits resulted in regular attendance, and she was finally discharged cured. In this case, the girl was put in touch with a girls' club, and it is believed that much social as well as physical good to her future life has ensued from the intervention of the visitor. It is reasonable to assume that the possible consequences of this girl's defaulting would certainly have been a danger to herself, and probably to others.

CASE 2.—A woman, aged 27, with congenital syphilis. This patient suffered from interstitial keratitis and iridocyclitis. She consented to visit the clinic only after many visits had been paid, and the visitor arranged to accompany her to the clinic. Subsequently, this patient defaulted, but after small personal problems had been dealt with treatment was continued more or less regularly. Her eye condition dramatically improved. This would not have been achieved if ordinary clinic methods of follow-up letters had been employed to secure further attendance.

Only by means of visiting can the real reason of defaulting be discovered. These patients are human—all too human. There are numerous obstacles to attendance, some minor and absurd, but they are often easily overcome by right handling. Weariness in attending, the wishful thinking whereby patients believe attendance unnecessary on the cessation of an obvious discharge, quarrels on the subject between husband and wife, ill health, the glib promise to attend given to the doctor in the clinic, the terror of discovery or losing a job, the threat to happiness, the guilty conscience or innocent shame—these factors, of enormous importance, show that cure of venereal disease is not entirely a medical problem.

Home visiting was worth while in the case of mothers who had been treated antenatally Such patients are prone to default. The birth of an apparently healthy baby convinces the mother that there is no further need to attend, while the added care of the baby renders attendance difficult. In several cases the private practitioner was said to have informed them they that did not require to attend.

Cases visited with the least success were those who live in " houses let in lodgings " and who frequently move from town to town. Several such women suffering from acute gonorrhœa (living in the same house and having been infected by the same man) attended for a short time, defaulted, and when they were visited it is found they have moved on, leaving no address. In one family where the children were congenitally infected the reason for defaulting given was that the journey to the clinic was too long. This reason would never have been given in response to a letter, but could only be elicited on visiting the home. In this case arrangements were made for the treatment to be given at a nearby school clinic.

In several cases it was discovered that the times at which the clinic was opened were unsuitable. It is of obvious importance for the staff in charge of a clinic to be acquainted with these deterrents, yet I do not see how the staff can realise all the difficulties unless the facts which are gained from home visiting are known to them. War-time difficulties of shift work, blackout, transport difficulties and increased female employment aggravate the obstacles to attendance, and it is more than ever important that these factors should be brought to light, so that the authorities can as far as possible make the clinics suit the patients, and make minor but nevertheless important improvements in clinic services.

In only 2 cases were there definite refusals to discuss the question of attendance at V.D. clinics. In 20 of the 134 the patients gave a definite refusal to attend, and this refusal was accepted. Medical officers have the consolation of knowing that, at any rate, the patients have been warned, and that every expedient has been used to ensure attendance. No attempt was made—nor was any necessary—to browbeat the patients into attending. In many cases, simple methods of explanation, kindness and encouragement were all that were required to dispel ignorance and fear and secure coöperation.

No attempt was made to solve the thornier problem of visiting defaulting male patients or contacts. I know of no record of this work being done at all in this country. On a pre-war visit to a Paris clinic I admired the ease and objectivity with which this work was done.

The confidential nature of venereal disease treatment was preserved. No legal difficulties were encountered. The scheme was economical—a useful point in persuading committees—the cost of the time of the nurse in visiting would not amount to more than £25 throughout the year. This expense is small in view of the results obtained in the 2 cases quoted above, apart from the general fact that some attendance of nearly half of the patients who had defaulted was secured, while the attendance of over a third of chronic defaulters to the end of treatment and tests of cure was ensured.

Very few venereal-disease clinics in this country use a home visitor to induce defaulters to complete treatment or to trace and treat contacts, yet I consider that the home visitor is an essential member of the team necessary to achieve greater success in this difficult work.

I acknowledge the ever-ready help and encouragement given by officers of the British Social Hygiene Council. Any success which the scheme had is due to the personal effort of Miss Hilda E. Myers of the Barnsley health department.

REEVE TO THE L.C.C.

THE mental hospitals committee of the council have always been farmers in a small way, for it was considered wise that patients at the mental hospitals of the council should where possible have a chance of doing healthy work in the open air, and farms were attached to several institutions. Since the outbreak of the war the farmland of the council has been nearly doubled—today they farm over 5000 acres—and last July they asked the committee to undertake the general control of their scattered plots. It therefore fell to the mental hospitals committee to present the report of the yield of the council's lands up to the end of March, 1941, though this was before they took over. The committee explain that the drastic rationing of foodstuffs caused a fall in the number of eggs produced (359,000 in 1941 against 556,000 in 1939). Outbreaks of foot-and-mouth disease reduced the number of cows kept and the milk production fell from 650,000 gallons in 1939 to 543,000 gallons in 1941. Next year, under the new scheme of coördination the committee hope to increase the production of vegetables, potatoes and animal foodstuffs by as much as 60%, 250% and 375% over their pre-war levels of 1200 tons, 1000 tons and 1400 tons respectively. If there should be a shortage of supplies the products of these farms will form a valuable pool of foodstuffs on which the claims of hospitals will be given priority.

CORRIGENDA.—The Minister of Health's request in circular 2498 (see *Lancet*, Nov. 8, p. 571) that tuberculosis notifications should reach him promptly was addressed to county councils and county borough councils. The circular was sent to the other bodies mentioned for information only.—In the summary of Major Palmer's article of Nov. 8 (p. 563) for " antitetanic serum " read " tetanus toxoid."

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ORIGINAL ARTICLES

HIGH STILLBIRTH AND NEONATAL MORTALITIES

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IN his book "Poverty and Population"[1] R. M. Titmuss quotes an estimate made by Dr. Enid Charles that if fertility remains at its present level the population of England and Wales will decline at the rate of 24% in each generation; so that on the basis of the 1931 census the number of children in 1945 will have decreased by 25%, and the number of people over 60 will have increased by 36%. Titmuss also quotes Glass who points out that in England and Wales there are great regional differences in fertility. The birth-rate of the south of England is much lower than that of the north and Wales. If the rates for the south-east had operated in the north and Wales during the decade ending 1936 our child population would have been reduced by about 250,000. Titmuss holds that it is illogical and inefficient to contemplate inducing people to have more children until we have judged the extent of contemporary waste in human life; for though it is only the higher fertility-rates in the north of England and Wales which are saving the country from a more rapid and disastrous decline in population, it is exactly in these areas that the infant mortality is highest. For example, in 1935 the infant mortality for Jarrow was 114 per 1000 live births as compared with 32 per 1000 for Coulsdon and Purley. Social conditions in Scotland are on the whole worse than in England, and there are similar variations in fertility so that the same conclusions can be drawn. The infant death-rate in Scotland in 1940 was 78 per 1000; for England and Wales it was 55 per 1000. It is obvious, therefore, that in Britain today many infants are dying who should not do so.

It has been recognised for some time now that the infant mortality is largely dependent on poverty and its resulting low standard of living. That neonatal mortality also depends on social conditions is suggested by the figures published by McNeil[2] who showed that in 1937 the neonatal mortality in Scotland was 38 per 1000, in the north of England 34 and the south-east 24. Comparing cities he showed that the rate for Glasgow was 43 per 1000, for Greater London 24, Chicago 25 and Amsterdam 16.

Less information is available about stillbirths; these were notifiable for the first time in Scotland in 1940, where the rate for that year was 42 per 1000 and for England and Wales 36 per 1000. Since most neonatal deaths are directly connected with pregnancy or childbirth, it is permissible to add them on to the stillbirths to get some idea of the number of children who reach the stage of viability and yet die as a result of some complication of pregnancy, labour or the puerperium. In Scotland during 1940 the figure was 80 per 1000 births; this seems a dangerously high figure, especially when taken in conjunction with the falling birth-rate.

Before one can give any opinion as to how the figure can be lowered it is important to study the actual causes of death in detail. This can only be done in hospital where records are detailed and an autopsy is usually carried out. With this end in view we have analysed the stillbirths and neonatal deaths occurring in the Aberdeen Maternity Hospital during the years 1938–40 inclusive. The cases were divided into booked cases and emergency cases.

MORTALITY IN BOOKED HOSPITAL CASES

There were 93 stillbirths (27·1 per 1000) among the 3427 booked cases. In 49 the child was mature and in 44 premature. Among the full-time cases there were two main groups. In the first group (19 cases) no adequate explanation could be found to explain the stillbirths; the fœtus died before the onset of labour or during the course of an easy labour, and in some of these a small tentorial tear was found with or without intracranial bleeding. In the second group (12 cases) trauma was the important factor and here the labour was difficult, owing to breech presentation, prolapse of the cord or uterine dysfunction; the death of the child was understandable, being due to asphyxia, shock or cerebral hæmorrhage. In the premature babies (44 cases) prematurity was the chief factor in bringing about the stillbirths. In some cases a pathological condition of the mother was present (pre-eclampsia in 6 cases, debility in 5, placenta prævia in 4, accidental hæmorrhage in 3) but in almost half of the cases (19) no explanation for the premature onset of labour could be found. The stillbirth figure of 27·1 per 1000 births seems high but compares favourably with the stillbirth-rate of 39 per 1000 for the city generally and 42 per 1000 for Scotland as a whole. In the present state of our knowledge the figure cannot be reduced substantially.

During the same period there were 94 neonatal deaths among booked cases (46 full-time and 48 premature)—a rate of 27·4 per 1000 births. Causes of death in the group of full-time babies were: infection 18, trauma 6, unknown 5, gross fœtal deformity 6, atelectasis 3, accidental hæmorrhage 1, placenta prævia 1, suffocation by overlying (after discharge from hospital) 3, miscellaneous 3. Among the 18 deaths due to infection, 16 occurred after discharge from hospital. As far as could be ascertained, 7 were due to pneumonia and 9 to gastro-enteritis. The 2 deaths in hospital were due to pneumonia. It appears, therefore, that the risk of infection in full-time babies in a well-run maternity hospital is much less than in the home. Of the 6 deaths from trauma, 3 followed difficult labour and might have been avoided if cæsarean section had been done; the other 3 followed fairly easy labour.

The factors responsible for the onset of premature labour in the cases where death was associated with prematurity were as follows: unknown 17, debility 7, pre-eclampsia 5, twin pregnancy 8, eclampsia 3, accidental hæmorrhage 1, placenta prævia 3, gross fœtal deformity 2, miscellaneous 2. The important factor here again is the unknown one. In 17 cases no reason could be detected by clinical means to explain why labour came on prematurely. The actual cause of death in these cases may have been cerebral hæmorrhage, atelectasis, pneumonia or gastro-enteritis, but it was felt that the important predisposing factor was the prematurity.

The neonatal mortality for the City of Aberdeen is 33 per 1000 and for booked cases in hospital 27·4 per 1000, but if the deaths due to infection after leaving hospital and overlying are removed the figure falls to 21·3 per 1000. Any substantial fall below this figure could only be effected by the prevention of premature labour; this problem will be discussed later.

MORTALITY IN EMERGENCY CASES

During the years 1938–40 there were 187 stillbirths in 616 emergency cases—83 in full-time deliveries and 104 in premature cases. In the full-time cases the most common cause of stillbirth was a mechanical factor—difficult labour and placenta prævia (41 cases or 50%). Many of the deaths in this group could have been avoided by earlier admission to hospital. Pre-eclampsia in the mother, in some cases followed by accidental hæmorrhage, accounted for 24 stillbirths. Some of the deaths in this group could have been avoided by better antenatal care and earlier admission to hospital with longer rest in bed. There were no other groups of importance.

As regards stillbirths in premature babies, the biggest factor was toxæmia in the mother (50 cases or almost 50%). The other categories were accidental hæmorrhage without toxæmia 11 cases, placenta prævia 15, cause unknown 12. In these groups fewer of the deaths are avoidable. In some of the cases of toxæmia better antenatal care would have saved the child's life, but many were probably unavoidable; they include cases where the mother made a poor response to treatment, fulminating cases, and others where intra-uterine death of the fœtus occurred even where the toxæmia was apparently mild and responding well to treatment.

1. London, 1938. 2. McNeil, C. *Lancet*, 1940, 1, 912.

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There must, therefore, be a large wastage in the toxæmia group until more is known about the ætiology of eclampsia. The deaths from placenta prævia are unavoidable.

Of the neonatal deaths in emergency cases, 24 occurred in full-time babies. The causes of death here were: trauma 15, unknown 2, placenta prævia 1, infection 1, gross fœtal deformity 3, miscellaneous 2. In most of these cases of trauma the death was due to cerebral hæmorrhage following difficult labour, and without doubt some of the deaths could have been avoided if the mothers had been sent into hospital earlier in labour. Deaths occurred in 55 premature babies and the causes of the premature onset of labour were: unknown 10, toxæmia 8, accidental hæmorrhage 9, twin pregnancy 5, placenta prævia 8, debility 2, gross fœtal deformity 2, miscellaneous 11.

DISCUSSION

Booked cases.—In order to assess the wastage of child life from obstetrical causes it is convenient to consider the stillbirth and neonatal death-rates together. In the Aberdeen Maternity Hospital during the years 1938–40, out of 3427 booked cases there were 187 stillbirths or neonatal deaths; this rate of 54·5 per 1000 is much less than the figure of 69·8 per 1000 for the city as a whole. Discounting the Maternity Hospital booked cases, the figure for obstetric practice for the rest of the city—that is to say, domiciliary midwifery and emergency cases sent to hospital—is about 78·5 per 1000, which compares very unfavourably with the figure of 54·5 per 1000 for the hospital booked cases.

Among full-time babies (95 cases) the cause of death was unknown in 25·3% of cases; trauma accounted for 18·9%, infection for 18·9% and gross fœtal deformity for 8·3%. A few of the deaths from trauma might be avoided. The deaths from infection occurred after the children had gone home and are thus at present unavoidable, so that the main scope for improvement is in the large group where no adequate explanation exists to account for the death.

Most of the premature babies (92 cases) who die succumb within 24 hours of birth because they are so feeble. The cause of the premature onset of labour was: unknown in 37%, toxæmia in 15·2%, debility in 13%, twin pregnancy in 8·7%, placenta prævia 7·6%, gross fœtal deformity in 5·5%, miscellaneous in 13%. The more highly skilled the care bestowed on them, of course, the more chance these infants have of survival, but even with the best care many of them die. Table I shows that where the child weighs more than 4½ lb. at birth the chance of survival is good, but that with children under this weight the mortality rises abruptly. An analysis of the neonatal deaths in premature babies in hospital shows that in a series of 89 cases, 76 were under 4½ lb. and of these 59 lived less than 24 hours. The problem therefore involves more than improved pædiatrics.

TABLE I—RESULTS OF TREATMENT OF 352 PREMATURE BABIES IN THE ABERDEEN MATERNITY HOSPITAL, DURING 1938, 1939 AND 1940

Weight at birth (lb.)	5½–5	5–4½	4½–4	4–3½	3½–3	Under 3
Infants	142	75	55	32	23	25
Deaths	7	6	22	16	14	24
Death-rate per 1000	49	80	400	500	643	960

Emergency cases.—As far as the analysis of the deaths in emergency cases is concerned different conclusions must be drawn. Out of a total of 266 stillbirths and neonatal deaths in this group, 107 occurred in full-time babies and the biggest individual factor here was trauma (41%), followed by toxæmia 12%, accidental hæmorrhage 16%, and placenta prævia 12%. Trauma, placenta prævia and toxæmia together account for 65% of the deaths and most of these could be avoided by better obstetrics. A big reduction could be achieved by checking the blood-pressure regularly, avoiding the use of forceps till the head is low in the pelvis, and by sending all cases of antepartum hæmorrhage to hospital as soon as there is any bleeding.

TABLE II—ANALYSIS OF 250 CASES SEEN IN SPECIALIST PRACTICE, 708 BOOKED CASES SEEN IN NURSING-HOME PRACTICE AND 3427 BOOKED CASES SEEN IN HOSPITAL

Parity of mother	Full-time cases: Infants	Full-time cases: Stillbirths and neonatal deaths	Premature cases: Infants	Premature cases: Stillbirths and neonatal deaths	Pregnancies ending prematurely (%)	Death-rate per 1000 births
SPECIALIST PRACTICE						
1	136	1	3	0	..	..
2	61	1	1	0	..	..
3	30	1	1	0	..	..
4	13	0	0	0	..	..
5 and over	5	0	0	0	..	..
	245	3	5	0	..	..
NURSING-HOME PRACTICE						
1	404	11	43	18	9·6	64
2	164	4	5	2	3	35
3	63	1	3	0	4·5	16
4	21	2	0	0	..	..
5 and over	5	1	0	0	..	..
	657	19 (28·6/1000)	51	20 (400/1000)	..	..
HOSPITAL PRACTICE						
1	1137	39	117	34	9·3	58
2	723	17	65	19	8·3	44
3	431	14	41	13	8·7	57
4	238	8	22	5	8·4	50
5 and over	597	17	56	21	8·6	60
	3126	95 (30/1000)	301	92 (306/1000)	..	..

In the 159 deaths from prematurity among emergency cases the cause of the premature labour was: toxæmia 26%, accidental hæmorrhage 25% (more than half of these also had toxæmia), placenta prævia 14·5%, unknown 13·5%. About a third of all the cases of premature labour were due to pre-eclampsia or pre-eclampsia complicated by accidental hæmorrhage; in more than half of these the antenatal care was poor. In cases of accidental hæmorrhage without toxæmia, cases of placenta prævia and cases where the cause of the onset of labour is unknown (62 cases, or 39% of the total), little can be done in the present state of our knowledge.

As far as the emergency cases are concerned there is great scope for improvement in both antenatal and intranatal care, which would result in the saving of many children. Among booked cases only slight improvement in the infant death-rate can be looked for by improvement in treatment along the present lines. The big factors are the toxæmias (the ætiology of which is understood so little), unexplained death and unexplained premature labour.

Biochemical studies in metabolism would be valuable in the investigation of this problem, but we have not found it possible to undertake such investigations under present conditions. We have, however, tried to find out whether there is any relationship between poverty and the high incidence of prematurity and stillbirths of unknown origin. For this purpose we have compared booked cases in the maternity hospital with those of nursing-home and specialist practice. Unfortunately, the numbers of the two latter groups are small and conclusions must be accepted with reserve.

The figures for specialist practice (table II) show 3 deaths in 250 deliveries (12 per 1000). The deaths were due to: anencephaly, melæna neonatorum, and cerebral hæmorrhage following spontaneous delivery. There were only 5 premature labours, all due to pre-eclampsia, and no deaths among them.

An analysis of nursing-home cases (table II), shows two points of interest. First, there were a few deaths in full-time babies; these were mostly due to cerebral hæmorrhage following difficult labour (for example, breech presentation or forceps delivery in vertex cases). Secondly, a number of deaths occurred from prematurity, generally the result of pre-eclampsia (13 out of 18 of the infantile deaths in primiparæ). The incidence of prematurity was much greater in first than in later pregnancies; 9·6% of all babies in primiparæ were premature

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and only 3% in a second pregnancy. This in itself raises the fœtal death-rate in the first pregnancies, since, as the table shows, the fœtal death-rate in premature babies is much higher than in full-time babies. The total infant death-rate, including stillbirths and neonatal deaths, was 55 per 1000 births.

Among the hospital booked cases (table II) the mortality for full-time babies was also much lower than for premature babies (30 per 1000 against 306 per 1000). In contrast to the nursing-home figures, the proportion of premature labours to the total did not fall off after the first pregnancy, and because of this the death-rate among the babies remained almost the same in each parity. Whereas the main cause of fatal prematurity in nursing-home practice was pre-eclampsia, in hospital the largest group came under the heading of "cause unknown" (37% of the total).

The cause of death among full-time babies in booked hospital cases was undetermined in by far the biggest group, in contrast to the nursing-home cases or the emergency hospital cases where the commonest cause of death was trauma following difficult labour. The almost complete absence of the "unexplained" factor as a cause of death in nursing-home and specialist practice and the difference in the incidence of premature labour points to the importance of economic factors, the most important of which would be deficiency in diet and lack of adequate rest among the poor. Attendance at a hospital antenatal clinic and delivery under the best conditions in hospital will accomplish a great deal for these people. In Aberdeen the comparative figures show that they can reduce the wastage of life due to both stillbirth and neonatal mortality from 78·5 to 54·5 per 1000; in fact, if these figures are corrected for babies dying of infection after dismissal from hospital, the relative figures are 81·7 and 48·4. These measures, however, cannot neutralise the effects of faulty diet and poor home conditions. The figure of 12 per 1000 for specialist practice shows what can be accomplished where these adverse factors do not operate. In this last group, the patients had not only good nursing and medical attention but good home conditions with the advantages of better education and sound nutrition. The figures encourage the hope that when the living conditions of the poor resemble in their essential details those of the more prosperous section of the community a big saving in child life will result.

The numbers presented here are far too small for any conclusions to be drawn with confidence, but they call for a similar analysis on a large scale. Should the conclusions be substantiated they are doubly important in war-time when living conditions deteriorate and diet may become deficient. In peace-time, first-class proteins and the protective foods were too expensive to be used in sufficient quantity by the poor. Since the outbreak of war the Government, by such measures as the milk scheme, has done something to remedy this evil; but since there is a shortage of first-class proteins and protective foods diets are likely to remain deficient. It is important to see that extra foodstuffs are given in the first instance to those who need them most—expectant mothers and all growing children. The most efficient and economical method of doing this is by a widespread extension of communal dinners. The expectant mother would thus be assured of one meal daily which would contain all the substances thought to be necessary for the wellbeing of her child. She would have a much needed respite from cooking and washing-up, and there would be ample opportunity for practical education in the principles of good nutrition.

SUMMARY

The causes of stillbirth and neonatal deaths in the Aberdeen Maternity Hospital have been analysed. In 3427 booked cases where the baby was full-time there was no adequate explanation of the death in 25·3% of the total; trauma accounted for 18·9% and fœtal deformity for 8·3%. There were few deaths from infection in hospital.

Among the premature births no adequate explanation of the reason for the premature onset of labour could be found in 37%; toxæmia accounted for 15·2%. The death-rate was largely determined by the degree of prematurity.

The combined stillbirths and neonatal deaths in private specialist practice, in hospital practice and domiciliary practice were found to be 12 per 1000, 54·5 per 1000 and 78·5 per 1000. The low figure in the first group is probably due to a combination of favourable factors—economic, nursing and medical. In the second group the nursing and medical factors are favourable but economic conditions are unfavourable. In the third group the high figure indicates the need for an all-round improvement in medical and nursing care as well as economic conditions.

There is thus a large wastage of child life (approximately 80 per 1000 births) associated with childbirth in Scotland, intimately connected with unfavourable economic conditions, and malnutrition and fatigue in the mother. If investigations on a large scale substantiate these findings, then measures to ensure proper feeding and care of pregnant women are urgently needed.

RELATIONSHIP OF EXANTHEMATIC AND ENDEMIC TYPHUS

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IT has long been recognised that an attack of endemic typhus protects against infection with exanthematic typhus and vice versa, but the exact relationship between exanthematic and endemic typhus has remained obscure. The usual suggestion is that endemic typhus is the more primitive form, the exanthematic typhus rickettsiæ resulting as a modification from continued passage through the human host and the human body louse (cf. Castaneda 1940). There may exist intermediate strains between those that do and those that do not cause inflammation of the tunica vaginalis of the guineapig (Castaneda and Silva 1939). Earlier efforts to demonstrate an antigenic relationship in animals were however not very successful. Zinsser and Castaneda (1930, 1933), Varela, Parada and Ramos (1932) and Mooser and Sparrow (1933) either completely failed to show any immunity or found only a partial immunity when guineapigs immunised with killed endemic typhus rickettsiæ were subsequently inoculated with exanthematic rickettsiæ. The antigens used by all these workers were, however, comparatively weak, being prepared from the peritoneal washings of rats treated with benzol and then infected with endemic typhus. Veintemillas (1939), using a more concentrated antigen prepared from irradiated rats and, giving multiple injections, protected all of his test animals against an exanthematic strain of typhus rickettsia isolated in Mexico. With still richer antigens prepared from the lungs of mice and rats more striking evidence of cross-immunity between endemic and exanthematic typhus has been obtained in guineapigs.

Finlayson and Grobler (1940), using a vaccine prepared in Castaneda's laboratory from an endemic typhus strain isolated in Mexico, reported that they were able to protect guineapigs against infection by both endemic and epidemic virus from South Africa. A single injection of 1 c.cm. was sufficient to protect against endemic strains, whereas two injections of 1 c.cm. were required to protect against exanthematic strains. Later Finlayson (1940) found that when the vaccine was concentrated to half its original volume by precipitation with alum guineapigs were protected against the exanthematic strain by a single injection of 1 c.cm. Analogous results have been reported by Castaneda (1941) using a murine lung vaccine from an orchitic strain L, isolated in Mexico, as an antigen against the Breinl strain of exanthematic typhus. Of 11 guineapigs given three injections of 1 c.cm., 8 were completely protected and 3 partially protected; of 11 guineapigs given two injections, the total amount per animal varying from 0·5 to 2 c.cm., 6 were protected and 5 partially protected; of 5 guineapigs given one injection of 1 c.cm., 2 were partially protected and 3 were unprotected. It would thus seem that in guineapigs the degree of immunity bears a relationship to the amount of antigen injected. The question whether a similar relationship holds good in man is uncertain.

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AN EXPERIMENT IN MAN

Although a considerable number of human beings have been inoculated with rickettsiæ in an effort to produce immunity against typhus very little is known about the efficacy of these various forms of vaccination. The following unrehearsed experiment may therefore be worth placing on record.

In January, 1940, G. M. F., aged 47, was given three injections of Weigl's louse vaccine containing killed exanthematic typhus rickettsiæ: no reaction occurred but there was no positive Weil-Felix reaction and no rickettsicidal power could be shown in the serum by the intradermal test in rabbits devised by Giroud (1938). During April, 1940, four injections of 1 c.cm. of a mouse-lung vaccine, prepared by Durand and Giroud (1940), were given at intervals of five days; the vaccine again contained killed exanthematic typhus rickettsiæ. There was no local or general reaction but subsequently the serum was shown to contain rickettsicidal immune bodies by the intradermal test in rabbits against exanthematic typhus. During the next six weeks experiments were carried out on the intranasal instillation into mice of both exanthematic and endemic typhus rickettsiæ. In June G. M. F. developed a febrile reaction lasting five days with maximum temperature 101° F. and for the first two days considerable frontal and postocular headache. A very few discrete roseolar spots were seen on the abdomen and side of the chest. On the second day of fever blood was injected into rats and guineapigs. An orchitis-producing strain of typhus rickettsia was isolated. There were no complications and it was possible to return to work within a fortnight.

A week before G. M. F.'s illness, a laboratory technician, aged 18, had gone sick with headache and fever. He had received one injection of 1 c.cm. of the mouse-lung vaccine containing killed exanthematic typhus rickettsiæ. Three days after receiving the injection he complained of slight headache with no rise in temperature and two days later was given a second injection of 1 c.cm. of the same mouse-lung vaccine. Twenty-four hours later his morning temperature was 100·2° F. He developed fever which continued for a fortnight, maximum 103·8° F., associated with headache, photophobia and a transitory rash. On the third day of fever blood was injected into rats and guineapigs. An orchitic strain of rickettsia was obtained from the blood.

From both cases a strain of endemic typhus rickettsia was thus obtained but the disease was far more severe in the technician than in G. M. F. The same batch of vaccine was subsequently inoculated into 12 other persons not actively engaged in typhus investigations without causing any febrile reaction, and when injected into guineapigs it also failed to produce fever. In both the cases here recorded the infection was therefore contracted during work with active endemic typhus rickettsiæ, being apparently modified in the first case by the presence of some degree of immunity against exanthematic typhus, despite the fact that typhus is usually more severe over the age of 40. This unrehearsed human experiment therefore bears out the contention that there is a close antigenic similarity between rickettsiæ of exanthematic and endemic typhus.

CONCLUSION

In two cases of endemic typhus infection was contracted in the laboratory. In one the infection was apparently modified by previous immunisation with killed exanthematic typhus rickettsiæ, thus confirming observations in guineapigs which suggest that the relationship between the rickettsiæ of exanthematic and endemic typhus is quantitative rather than qualitative.

REFERENCES

Castaneda, M. R. (1940) Profilaxis especifica del tifo exantematico, Mexico.
— (1941) *Bril. J. exp. Path.* **22**, 167.
— and Silva, R. (1939) *Publ. Hlth Rep. Wash.* **54**, 1337.
Durand, P. and Giroud, P. (1940) *Arch. Inst. Pasteur Tunis*, **29**, 234.
Finlayson, M. H. (1940) *Sth Afr. med. J.* **14**, 247.
— and Grobler, J. M. (1940) *Ibid*, **14**, 129.
Giroud, P. (1939) *C.R. Soc. Biol., Paris*, **127**, 397.
Mooser, H. and Sparrow, H. (1933) *Arch. Inst. Pasteur Tunis*, **21**, 1.
Varela, G., Parada, M. A. and Ramos, V. (1932) *Proc. Soc. exp. Biol., N.Y.* **30**, 206.
Veintemillas, F. (1939) *J. Immunol.* **36**, 339.
Zinsser, H. and Castaneda, M. R. (1930) *J. exp. Med.* **53**, 325.
— — (1933) *Ibid*, **57**, 381.

RADIOLOGICAL VISUALISATION OF THE EUSTACHIAN TUBE

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THE possibility of obtaining information by contrast radiological examination of the eustachian tube became manifest to us during the course of a clinical investigation of the conductive form of deafness which sometimes occurs during loss of altitude in aircraft. Since the results have proved of practical value an account of our technique may be of use to others engaged in similar work.

This type of deafness is considered to be due primarily to obstruction of the eustachian tube brought about by an inequality of the atmospheric and intratympanic pressures. According to Armstrong and Heim (1937) a positive atmospheric pressure which exceeds that within the middle-ear cleft by 90 mm. of mercury may bring about closure of the tube. Nevertheless, in spite of the signs and symptoms, and the studies carried out by Armstrong and Heim and other observers, there is no positive proof that the aural symptoms result from blockage of the tube.

For the purposes of these notes the eustachian tube may be regarded as consisting of two cones of unequal length united at their apices (fig. 1). In the adult it

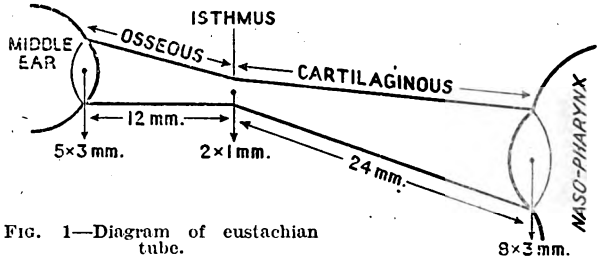

FIG. 1—Diagram of eustachian tube.

measures 35–40 mm. in length, and it forms an angle of 45° with the sagittal plane and of 30° with the horizontal plane. The pharyngeal cone—cartilaginous or membranous portion—represents two-thirds of the entire length and its nasopharyngeal ostium measures 8 mm. by 5 mm. The tympanic cone—osseous portion—constitutes the remaining third of the tube and the dimensions of its opening into the middle ear are 5 mm. by 3 mm. The tubal lumen is narrowest at the junction of the apices—the isthmus—where it measures only 2 mm. by 1 mm.

Published accounts of the radiological examination of the eustachian tube are few.

Spielberg (1927) passed a no. 4 silk catheter "about 3 cm. to 4 cm. within the membranous tube" through a silver catheter and then insufflated 10–15 drops of iodised oil either by a small air-pump or a soft rubber bulb. He stated, also, that the eustachian tube could be filled with iodised oil through any metal tube without inserting a silk catheter. If the measurements given are accurate the silk catheter was certainly in the osseous canal, if not in the middle ear. Furthermore it is our experience that, although it may be possible in some cases to introduce radio-opaque oil through an eustachian catheter alone, it is a haphazard method which affords incomplete pictures of the lumen of the tube.

Engel (1932) demonstrated the lumen of the tube throughout its entire length in a patient suffering from suppurative infection of the peritubal cells which had ruptured into the nasopharynx. While tracing the fistula from its outlet he filled the eustachian tube with opaque oil.

Heimendinger (1938) took lateral and verticomental views of his patients after the passage of silk bougies impregnated with bismuth. He endeavoured to inject iodised oil into the tube but was unsuccessful because the oil escaped from the nasopharyngeal orifice.

Our experiments have shown that in order to obtain satisfactory radiograms it is necessary to introduce into

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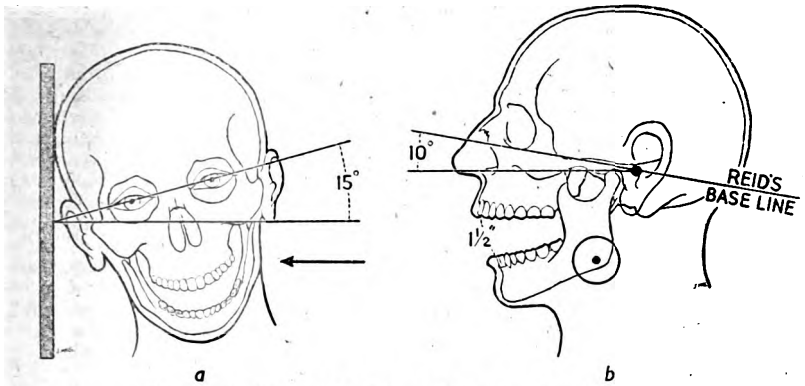

FIG. 2—Positions of skull for radiography of eustachian tube.

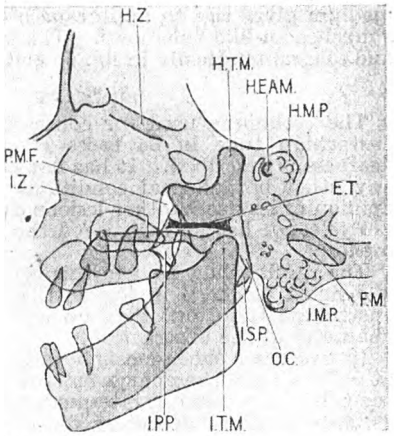

FIG. 3—Relations of shadow cast by eustachian tube to surrounding bony structures. H = heterolateral; I = ipsolateral; Z = zygomatic arch; T.M. = temporomandibular articulation; E.A.M. = external auditory meatus; M.P. = mastoid process; F.M. = foramen magnum; O.C. = basi-occiput; S.P. = styloid process; P.P. = pterygoid plate; P.M.F.; pterygomaxillary fissure.

the tube a non-irritating opaque medium of low viscosity, and as far as possible to eliminate overlying bony shadows by positioning.

TECHNIQUE

Introduction of opaque medium.—An eustachian catheter is passed into the orifice of the tube via a previously anæsthetised nasal fossa, and a tympanic catheter is then gently pushed through this into the lumen of the tube until it meets with an obstruction. An obstruction has been present in all of the 34 cases in our series, and its site has varied from 0·5 cm. to 2·5 cm. from the tip of the catheter. It is essential at this point to confirm the position of the catheter with a postnasal mirror, and it is surprising and instructive to note how sometimes the tympanic catheter is lying altogether outside the tubal ostium, above or behind the cushion. The stilette is removed and the tympanic catheter itself withdrawn so that not more than 0·5 cm. of its length is projecting into the eustachian tube; 10 minims of opaque medium is then injected into the tympanic catheter under moderate pressure from a well-fitting syringe. The air contained in the tympanic catheter and the excess of opaque medium escape into the nasopharynx round the tip of the catheter. Occasionally the patient feels a sharp pain in the ear for a few seconds, but this is not evidence of patency of the tube since it has occurred in several cases of tubal obstruction.

Opaque media.—We have found iodised oils to be unsatisfactory media because their high viscosity renders their passage almost impossible through the small lumen of the tympanic catheter. A 10% solution of sodium iodide afforded a satisfactory shadow, but one patient developed an acute otitis media after injection so that its use was abandoned. Latterly we have employed Pyelectan, which has caused no untoward symptoms and gives an adequate shadow.

Position.—Patients appear to be least uncomfortable in an upright posture when the catheter is in situ, and fig. 2 shows the positions of the skull for radiography of the eustachian tube. The head is placed in the true lateral plane with the chin tilted away from the cassette at an angle of 15°. The central ray passes through the angle of the mandible of the opposite side to that under examination. The mouth is widely opened, and the head inclined backwards so that Reid's base line forms an angle of 10° with the horizontal plane. Fig. 3 shows the situation of the shadow cast by the eustachian tube when filled with opaque medium in relation to the surrounding bony structures when the skull is in the positions described.

Exposure factors.—All the films were taken at 56 kV and 40 milliampere seconds. Intensifying screens were used and the radiography was carried out at a distance of 33 in.

RESULTS

Visualisation on the films is good as far as the isthmus. It has been impossible to make any radiological study of the osseous portion of the tube, because in all of our patients an obstruction was demonstrated in the cartilaginous segment. In two cases the blockage began at the isthmus, in one at 0·5 cm. from the pharyngeal orifice and in the remaining thirty-one cases at 1–2 cm. from the ostium.

The shadows cast are faint in comparison with the surrounding structures, so that positive reproductions give a totally inadequate representation of the definition which is actually obtained on the X-ray film. For this reason only two typical radiograms are here shown (figs. 4*a* and *b*).

The X-ray appearances in our series have fallen into two distinct groups. When the obstruction is at or near the isthmus there is a shadow with comparatively smooth edges gently fading to a point at the junction of the cartilaginous and osseous portions. This can be seen in fig. 4*a* and is reproduced in fig. 5*a* and *b*. There is always an overflow of medium which regurgitates down the lateral wall of the pharynx and occasionally over the soft palate. The most common form of obstruction occurs at 1–2 cm. from the

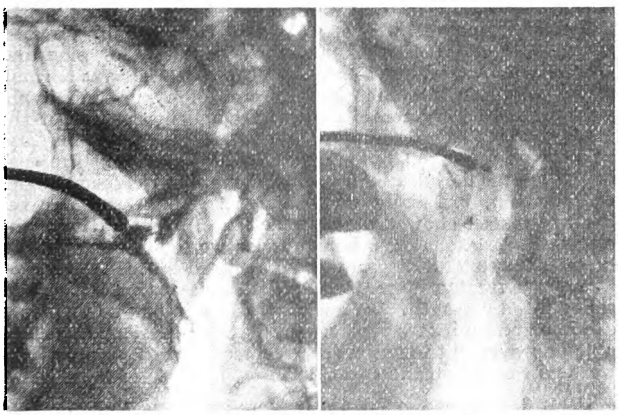

FIG. 4—Typical radiograms of eustachian tube after injection of pyelectan. In (*a*) cartilaginous portion of tube is filled as far as isthmus; in (*b*) medium is arrested 0·5 cm. from tip of catheter.

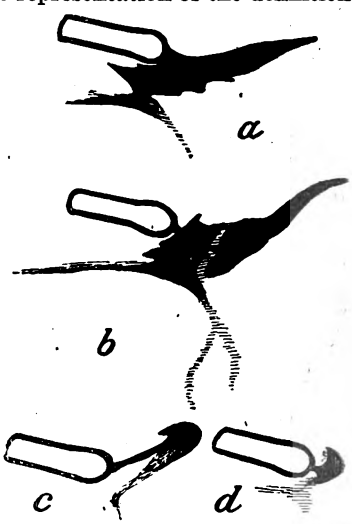

FIG. 5—Tracings of typical shadows observed in cases of eustachian obstruction. (*a*) and (*b*) obstruction at or near isthmus. (*c*) and (*d*) obstruction 1–2 cm. from tip of catheter.

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catheter tip and in these situations pooling of the opaque medium gives rise to appearances which are typical as "mushroom-like" shadows. This type is shown in fig. 4*b* and diagrammatically in fig. 5*c* and *d*.

SUMMARY

The technique used for contrast radiography of the eustachian tube in 34 cases of aviation "pressure" deafness is described. It has not been used to elucidate any other pathological conditions of the tube, and no opinion of its use in other lesions can be expressed.

Pyelectan has so far proved the most suitable opaque medium.

The results show that in this type of deafness there is a definite blockage in the cartilaginous portion of the eustachian tube, but they do not reveal the extent or character of the obstruction.

In two cases the stenosis began at the isthmus, in one at 0·5 cm. from the pharyngeal orifice and in the remaining thirty-one cases at intermediate sites.

These findings definitely dispose of the theory that there is a valve-like action of the pharyngeal orifice which, by its closure, prevents the entrance of air into the tympanum.

Our thanks are due to the Commanding Officer of this hospital and to the Director General of Medical Services, R.A.F., for permission to publish these notes.

REFERENCES

Armstrong, H. G. and Heim, J. W. (1937) *J. Amer. med. Ass.* **109**, 417.
Engel, F. (1932) *Beitr. Anat. &c., Ohr.* **30**, 322.
Heimendinger, E. (1938) *Rev. Laryng., Paris*, **59**, 303.
Spielberg, W. (1927) *Arch. Otolaryng., Chicago*, **5**, 334.

BRACHIAL NEURITIS OCCURRING IN EPIDEMIC FORM

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THE occurrence of a number of cases of brachial neuritis in the outpatient department of the National Hospital and elsewhere in the last few months suggests that the condition may be the result of an epidemic infection. I can find no reference to any similar condition in the literature, although of course isolated cases of brachial neuritis are well known. The following 4 cases are typical of a series of 42.

CASE-RECORDS

CASE 1.—A house-painter aged 54, admitted on Dec. 2, 1940. He had suffered from a number of carbuncles in the previous 6 years. In May, 1940, he developed two of these in the right axilla which after incision healed in 4–5 weeks. He returned to work in June, but soon began to experience weakness in lifting his right arm above the horizontal and a severe ache in the middle of the arm, accentuated by use of the limb. In the course of the next 6 weeks the pain became so severe that he had to give up work and could not sleep at night. The ache spread down to the elbow along the inner side of the forearm to the wrist and up to the shoulder; it was accompanied by severe stabs of pain, "like red-hot pokers being pushed down the arm," which awakened him at night. Pain ceased at the wrist but began again along the lower third of the palm as a numb, swollen sensation involving the four fingers, back and front, and originating from painful spots in the pads of the hands and fingers; most severe in the region of the point of the shoulder. Any attempt to put the right hand on the back of the neck caused excruciating pain. Cold numbed the fingers further and accentuated the pain; warmth might relieve or greatly exaggerate it; movement accentuated it and lying still relieved it somewhat. There was no evidence that the condition was due to lead poisoning.

Temperature 99° F. on admission. Right shoulder lower than left. Right arm showed slight general wasting and very defective power in all movements, especially in those of the shoulder-joint, which caused great pain. Tendon reflexes brisk and equal on the two sides. In the area of skin supplied by the anterior primary divisions of C3–D3, including the whole arm, considerable pain was elicited by coarse handling, with slight hypo-æsthesia and hypo-algesia. Cold objects caused a painful response running up and down the arm like an electric shock; warmth, on the contrary, felt pleasant. There was great tenderness on pressure over the brachial plexus in the supraclavicular triangle, causing violent pins and needles in the whole limb. Deep sensation normal. No other abnormal physical signs. The cerebrospinal fluid, the blood-count, and a radiogram of the cervicodorsal spine were all normal. Sedimentation-rate was 3 mm. (200 mm. tube) in 1 hour (Westergren), urine normal. At first, the severity of the pain necessitated morphia injections, Antiphlogistine poultices to the arm, diathermy to the arm and neck, and a salicylate mixture by mouth. In the course of a month the pain greatly diminished. The temperature became normal on the second day. As the pain became less, massage was begun. Power gradually returned to the limb and when the man was discharged on Feb. 9, 1941, the pain was only slight and localised to an area in the region of the deltoid muscles.

CASE 2.—A housewife aged 30, admitted April 25, 1941. Eight weeks before, her first child had been born after a normal labour. Chloroform inhalations were used during delivery but no injections except morphia. Next day she had generalised aches and pains, especially across the shoulders and in the lumbar region. She could not sit up unaided and her lower limbs seemed weak and "almost paralysed." All these symptoms disappeared in 24 hours and she was well until 8 days afterwards, when a burning sensation appeared in the point of the right shoulder and deltoid muscle. In the next few days this extended to the elbow, became severe and kept her awake at night, but disappeared after 3 weeks, leaving her with a dull continuous ache in the region of the wrist and elbow, shoulder and lower part of shoulder blade and right side of neck. This was aggravated by movement and associated with a weakness of some movements, especially raising the arm above her head to do her hair, or stretching her arm out in front of her, which provoked sharp pain darting through the shoulder region. She also experienced pins and needles in the whole of the right extremity, coming and going and leaving a numb sensation behind. Since the onset she had also noticed pins and needles in all her toes, reaching at times as far as the knees and often accompanied by a sensation of heat and cold. The week before admission there had been a severe ache between the shoulder blades, stiffness of the neck, an ache in the left wrist and elbow like that in the right arm, and a sensation of pins and needles in this limb extending from the fingers to the wrist. Suckling her child brought on the pain severely.

The right arm showed no wasting, but there was much winging of the right scapula and weakness on raising the arm from the horizontal abducted position to above the head, on abduction and forward movement of the humerus, and on extension of the elbow. There was slight weakness of all other movements of the right elbow, wrist and fingers; the rhomboids, trapezius and latissimus dorsi were normal; there was slight fibrillation of the triceps. The left arm showed slight weakness of all movements. The right triceps jerk was brisker than the left but within normal limits. All other reflexes were normal. In the right arm, there was hypo-æsthesia to all superficial stimuli in patchy areas roughly corresponding to the segmental area of C5. These areas were interspersed with patchy areas of hyperæsthesia and other areas the touching of which caused a sensation of pins and needles, especially in the thumb and outer three fingers. In fact, the segmental area of C5 was surrounded by an area above (C4) and below (C6) where a sensation of pins and needles was evoked by pinprick. Deep sensation was normal. In the left arm, a similar patchy area of hyper- and hypo-æsthesia in the segmental area of D1 and in the tips of the inner three fingers. Similar hyperæsthesia and pins and needles were evoked by pinprick in all the toes. Pressure over the brachial plexus in both the supraclavicular triangles caused pain, especially on the right. The right serratus magnus muscle showed partial reaction of degeneration; the electrical reactions of other muscles were normal. C.S.F., blood-count and radiogram of spine were normal.

She was treated by massage and electrical stimulation, and salicylates by mouth.— In a month the pain and paræsthesiæ disappeared and were replaced by hypo-æsthesia. Considerable improvement in power had occurred and the tendon jerks were now equal on the two sides.

CASE 3.—A man aged 63, a secretary, was first seen on July 7, 1941. In October, 1940, he had noticed a severe ache starting in the back of the neck and running to the left shoulder down the outer side of the arm and forearm and dorsum of the hand. The pain was worse on movement or on moving

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the head sideways. The arm became very weak but the pain and weakness gradually improved. Early in April he had suddenly found that the right foot had dropped and he was unable to raise his toes from the ground. At the same time he noticed numbness in the outer side of the right calf, front of ankle and dorsum of the foot. This had remained unchanged. There was fairly severe weakness of all muscles of the left shoulder girdle and upper limb, proximally more than distally, and moderate wasting of all muscles. All tendon jerks were absent in the left arm. There was no superficial sensory loss, but considerable tenderness over the cords of the left brachial plexus and ulnar nerve. There was complete paralysis of dorsiflexion of the right ankle and toes, with inversion of the foot and some wasting and fibrillation. Reflexes were all normal. There was complete loss of sensation to all superficial stimuli in the skin area supplied by the right external popliteal nerve. Pressure over this nerve at the head of the fibula caused violent pins and needles in the area supplied by the nerve. There was no tenderness over the right sciatic nerve. No Laségues sign present; the lumbar spine was mobile.

CASE 4.—A woman of 67, seen on July 9, 1941. Three months before she had begun to get pain in the flexors of the wrist and fingers, just below the elbow, and this gradually extended up the outer side of the right arm to the shoulder and up into the side of the neck and region of the clavicle. It was of a hard, constricting nature and very severe, preventing sleep. The whole arm began to feel weak. A fortnight before admission it passed to the left shoulder and down the outside of the arm to the elbow and also to a small area on the ball of the thumb. The pain was burning and severe. This arm, also, gradually became weak. On examination she had moderate weakness in all muscle groups but especially in the deltoids, right more than left, and in the muscles moving the shoulder-joint. There was no wasting or fibrillation. All reflexes were diminished but just present. There was considerable hyperæsthesia and hyperalgesia and thermohyperæsthesia over the segmental areas of C5–6 on the right and C5 on the left, but there was slight diminution to all forms of superficial sensation over C3–D1 on both sides in the areas of the anterior primary divisions. There was much tenderness on pressure over the cords of both brachial plexuses, the right more than the left.

SUMMARY OF CASES

I have seen in all 42 cases of brachial neuritis between December, 1940, and August, 1941. Dr. J. Purdon Martin has recently seen several other cases presenting paralysis of the serratus magnus or radial-nerve lesions as their chief feature and associated with sensory changes in corresponding skin segments (thus resembling case 2), which are probably related to the condition under discussion. The cases show the following age-incidence:

30–39 years	6 cases	60–69 years	10 cases
40–49 „	9 „	70–79 „	8 „
50–59 „	9 „		

The youngest patient was 30 and the eldest 77. The condition was fairly evenly spread out over the whole range from 30 to 80. There were 13 cases in men and 8 in women. The left side was affected in 12, the right in 8, and both sides in 3. The months of onset were: June, 1940, 1 case; October, 1940, 1 case; January, 1941, 3 cases; February, 1941, 3 cases; March, 1941, 3 cases; April, 1941, 6 cases; June, 1941, 12 cases; and July, 1941, 13 cases. Thus the disease appeared in the winter and persisted into spring and summer.

The clinical features suggest that the anterior primary divisions of the spinal nerves from C3 to D4 inclusive, in whole or in part, are involved. In most cases the upper part of the plexus, and the skin segments served by C5–6 nerves, are most affected; but on careful examination there are also, in every case, sensory changes of a wider distribution. In one (case 2) there were less severe changes on the opposite side and slight sensory changes in the lower limbs. In most cases the motor weakness was general and in long-standing cases accompanied by wasting, but in others it was limited chiefly to one or two muscles—e.g., serratus magnus and triceps. Every case began with pain, often burning, and typically situated in the region of the shoulder blade. The tendon reflexes in the affected limb were usually increased or decreased, the former in earlier and less severe cases. The severity varied considerably from case to case, from mild cases rapidly responding to treatment to very severe cases (case 1).

The ultimate outlook is good and in the milder cases improvement soon sets in, but the more severe cases are very refractory to treatment as far as they have been followed.

The occurrence, in the winter and spring, of so many cases of what is normally a relatively rare condition, is remarkable. Only 13 such cases were admitted to the National Hospital between 1924 and the present outbreak. The close similarity to one another, the localisation of the lesion to the anterior primary divisions of the spinal nerves, and the tenderness in the region of the cords of the plexus and over the ulnar nerve in some cases, suggest that the condition is the result of an infection, and that the site of the lesion is in the nerves themselves at a point distal to the origin of the posterior primary divisions.

RELATIONSHIP TO EXTERNAL POPLITEAL LESIONS

In the last 3 months I have also seen 7 cases of lesions occurring suddenly and for no apparent reason in the external popliteal nerve. An example of this is case 5. There seems to be a relation between these cases and those of brachial neuritis; they have occurred during the same period and in case 3 the two conditions occurred at the same time.

CASE 5.—A cobbler aged 36, admitted on May 5, 1941. In 1938 he had a severe attack of left-sided sciatica and lumbago, which cleared up after 7 weeks' rest in bed. Three weeks before admission, while at work, he developed sudden left foot-drop, and in a few days numbness on the outer side of the calf and dorsum of the foot. On examination he had complete paralysis of dorsiflexion of ankle and toes and inversion of the foot. The tendon reflexes were normal. There was gross diminution of all forms of superficial sensation over the skin area supplied by the external popliteal, but no tenderness over the external popliteal or sciatic nerves. A radiogram of the spine and the C.S.F. were normal. The electrical reactions of the anterior tibial group of muscles were normal.

He was treated with antiphlogistine poultices, massage and electrical stimulation to affected muscles, and was given a bed-boot to support the foot. He improved considerably after 6 weeks' treatment.

DISCUSSION

What is the nature of this condition? Is it an infection by a neurotropic virus, like herpes zoster? Is it a "fibrositic" condition? This seems unlikely, since in no case were there other rheumatic manifestations. Is it an allergic reaction to some infection, like the brachial neuritis which occasionally follows serum injections? Case 2 suggests that this may possibly be so; here symptoms occurred 8 days after signs of a general infection following parturition. The period of 7–14 days is a common interval before allergic manifestations appear. In case 1 symptoms occurred about 5 weeks after the appearance of carbuncles. One case seen by Dr. Purdon Martin began with severe headache and a temperature of 104° F., and examination a few days later revealed winging of the scapula. Whatever the ætiology it seems to be a clinical entity, possibly the result of an hitherto undescribed infection which is appearing in this war for the first time. It may be connected with a number of cases of serratus-magnus palsy with sensory changes in corresponding skin segments and of cases of foot-drop and sensory changes in the skin area supplied by the external popliteal nerve, which have also occurred lately. No light can be thrown on the source of any infection. In no case did a patient frequent public air-raid shelters; there was only one case in which sore throat had preceded the illness. None had had serum injections, or showed any obvious nutritional defects. All my cases came from London, but in Dr. Purdon Martin's cases this has not been so.

SUMMARY

An unusual amount of brachial neuritis was seen in London in the eight months December, 1940–August, 1941, amounting to a small epidemic.

A series of 42 such cases is reported and 4 are described in detail.

The cause of the condition is unknown.

I wish to thank the honorary medical staff of the National Hospital for permission to publish the case-reports.

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RESISTANCE OF INFLUENZA VIRUS TO DRYING AND ITS DEMONSTRATION ON DUST

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RECENTLY attention has been directed to the part played by dust in the spread of disease, particularly infection due to *Streptococcus pyogenes* and *Corynebacterium diphtheriæ*.* Both these organisms are known to survive drying and can be recovered from the dust of rooms inhabited by infected patients (Thomas 1941, Crosbie and Wright 1941). Under experimental conditions it has been shown that by shaking and beating blankets on which streptococci have been dried the organisms can be distributed in the air on dust particles in a virulent form (Van den Ende, Lush and Edward 1940). In other infections the possibility of spread by dust obviously depends on the ability of the causal organisms to withstand drying. Although influenza is regarded as an air-borne infection, little attention has been paid to transmission by dust and it has not been determined whether influenza virus can resist drying under natural atmospheric conditions, the only data collected having been in regard to its resistance to drying in vacuo in the cold. It was therefore decided to investigate the possibility that dust might be a factor in the spread of influenza and to determine the resistance of the virus to drying.

SURVIVAL ON DUST

Throughout this investigation the PR8 strain of influenza A virus was used. Suspensions of virus were obtained by inoculating mice; their lungs were collected three days later and after being ground up were suspended in a mixture of equal parts nutrient broth and physiological saline. Tests for the presence of virus were made by inoculating batches of three mice intranasally under ether anæsthesia with 0·05 c.cm. of the suspension under test. Animals that died were examined post mortem for the presence of influenzal lung lesions. Surviving mice were killed on the tenth day and examined similarly.

One experiment was carried out to discover whether, after artificial impregnation of a blanket, the virus could survive and be distributed into the air by shaking. A previously sterilised strip of blanket about 20 in. × 8 in. was heavily impregnated with a 5% suspension of virus by means of a scent spray and was then hung up to dry. Five hours later it was shaken vigorously in a closed tank of about 10 c. ft. capacity. During shaking, and for 10 min. afterwards, air was sucked out of the tank through a Wells air-centrifuge at the rate of 2 c. ft. per minute. To collect the virus 10 c.cm. of broth had been placed in the rotating cylinder and this was finally tested by inoculating three mice intranasally. This method for recovering suspended influenza virus particles from the air was originally described by Wells and Brown (1936). The experiment was successful and moderate-sized influenzal lesions were obtained in each of the mice.

On another occasion a ferret was infected with the mouse-adapted strain of PR8 in use throughout the investigation. For the two or three days during which the animal was sneezing and showing the usual symptoms of infection several Petri dishes containing small amounts of sterilised dust were left exposed in various parts of the cubicle containing the ferret in its cage. At the end of this time each specimen of dust was well soaked in broth to extract any virus, centrifuged gently and the supernatant tested on mice. In this way virus was demonstrated in the dust from a dish placed next to the ferret cage and 3 in. away from it, but not from dishes placed further away in positions which could not be reached by direct droplet projectiles.

These experiments show that influenza virus can resist drying and can be demonstrated in dust that has been infected both artificially and naturally. The investigation was therefore continued, to assess quantitatively the degree of survival and persistence of the virus after drying and to examine the factors that might influence these, such as physical conditions and the nature of the surface on which the virus was dried.

EXPERIMENTAL METHODS

As test materials for impregnation the following were used:

Two in. squares of cotton sheet; 1 in. squares of serge, both of which had been previously well washed and then sterilised; glass microscope slides; and sterilised household dust, sieved sufficiently to remove the large fibres. The squares of sheet and serge were impregnated by allowing 0·7 and 1 c.c. respectively of 5% influenzal mouse-lung suspension to soak into them. On the glass slides 0·1 c.cm. of the suspension was spread as a thin film along the whole of one side. The dust was placed in Petri dishes and impregnated by rubbing 0·2 c.cm. of the suspension into it with a spatula, so that all the fluid was soaked up. In each case the samples were allowed to dry by exposing them to the air of the laboratory under the ordinary atmospheric conditions prevailing. They were afterwards stored in the dark in a cupboard until it was necessary to test them.

The following methods were used for extracting the active virus.

The squares of sheet and serge were soaked for 15 min. in 5 c.cm. of nutrient broth in Petri dishes, the fluid being afterwards squeezed out of them as much as possible by twisting with two pairs of Spencer-Wells forceps. The dust was thoroughly mixed with 5 c.cm. of broth and the mixture centrifuged gently to recover the broth. The slides were simply soaked in 5 c.cm. of broth. In each case the broth, and tenfold dilutions of it, were inoculated intranasally into mice to estimate the amount of virus recovered.

Except from the glass slides, it did not appear likely that these methods of extraction effected a complete recovery of viable virus. In order to find out the proportion recovered, control samples of the materials were impregnated in the manner described and extracted at once before drying took place. With the sheet there was no appreciable difference between the amount of virus recovered and that which was applied to it. Only 10% of the virus applied, however, was recovered from the serge and the dust.

SURVIVAL AND PERSISTENCE AFTER DRYING

Specimens of serge, sheet, dust and glass slides were impregnated in the manner described and the viable virus extracted before and after drying. It was found that between 1 and 10% of virus withstood drying on the serge and the dust and 10% or more on the glass slides. When squares of sheet were impregnated with 0·7 c.cm. of virus suspension, an amount sufficient to saturate the square almost completely, 1% of virus survived drying, but when 0·1 c.cm. of suspension was applied as a drop in the centre there was survival of little more than 0·01%. A similar difference in survival depending on the degree of impregnation did not occur with the serge, and the reason for the difference with the sheet is not apparent. In fact, the opposite effect might have been expected, if heavier impregnation had led to slower drying; for it was found that, if a square of sheet was impregnated with 0·7 c.cm. and drying took place slowly because of the humidity of the atmosphere, only 0·01% of virus survived.

After drying, impregnated specimens were stored in the dark in the laboratory and tested for active virus after one, three and seven days, and thereafter at weekly intervals. It was found that virus disappeared rather slowly at a regular rate; the length of time during which virus could be demonstrated on a substance depended on the amount initially present when drying was complete.

The largest amount of dried virus was obtained on the glass slides, and the persistence of this is shown in the table. In it the results of the titrations in mice are expressed numerically; and in the last column there is an estimate of the total active virus present on the slide, obtained by multiplying the reciprocal of the highest infecting dilution by 100, since the inoculum for a mouse was 1/100th part of the volume of broth used for extraction. It will be seen that after three days 10% of virus remained alive and after a week 1%. After five weeks virus could still be demonstrated although there was then only 0·01% of the amount originally present. The findings with dust were similar to those with sheet and

* A review of the subject appeared in a leading article in the *Lancet*, 1941, **1**, 511.

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serge, and they can be summarised as follows. When drying was complete there was approximately 1×10^4 M.I.D. of virus on specimens of each of these materials. A slight decrease might or might not be detected after three days; at the end of a week about 1×10^3 (10% of the original amount) remained alive and after two weeks 1×10^2 M.I.D. (1%). This was the least amount which could be detected and tests at three weeks were negative.

PERSISTENCE OF INFLUENZA VIRUS DRIED ON GLASS

Interval since impregnation	Mice inoculated with dilutions of broth extract			Estimated amount of viable virus in M.I.D.
	1/1	1/100	1/10,000	
4 hours ..	5.5.5	5.5.2	2.1.0	1×10^4
24 hours ..	5.5.5	5.5	..	..
3 days ..	5.5	3.2.2	..	1×10^3
7 days ..	5.5.5	1.1.0	..	1×10^2
2 weeks ..	5.5.5	0.0.0	..	1×10^2
3 weeks ..	3.2.1	0.0.0	..	1×10^2 to 10^3
4 weeks ..	2.1.1	..	..	1×10^2
5 weeks ..	2.1.0	..	..	1×10^2
6 weeks ..	0.0.0	..	..	Less than 1×10^3

Virus was extracted with broth and titrated in mice. Resulting infection is expressed in terms of a numerical index. Thus 5 represents death with influenzal consolidation of the lung. Among survivors, killed on the tenth day, consolidation affecting three-quarters of the lung is represented by 3, half by 2 and a quarter or less by 1.

Factors influencing survival and persistence of dried virus.—Temperature has a considerable effect on the time for which the dried virus remains alive. Squares of sheet and glass slides were impregnated with 0·1 c.cm. of virus suspension and dried in the usual way. Half of them were kept at 37° C. and half at 22° C. On sheet at 22° C. virus could be demonstrated on the third day and not on the seventh; at 37° C. it was not detectable at the end of twenty-four hours. On glass it was present in recognisable amount for four weeks at 22° C., but for less than one week at 37° C. On the other hand, the higher temperature did not have the same deleterious effect during the drying process. When impregnated specimens of sheet and glass were dried in the incubator at 37° C. and comparison made with the amount of virus surviving drying at 22° C., it was found that on glass there was little difference, and on sheet rather more virus withstood drying at 37° C. This may be due to an increased rate of drying at the higher temperature, leading to increased survival; on the glass the rate of drying of the thin film is probably almost maximal at 22° C.

Light also had a deleterious effect on the persistence of dried virus. Impregnated squares of sheet were placed in the dark as usual, and compared with similar squares kept on the bench near a window facing north. In the dark virus persisted for a week, but in the light it was not detected on the third day.

In order to examine the possible effect of the amount of protein in the suspending fluid, and to mimic more closely natural secretions infected by virus, 5% suspensions of influenzal mouse lung were made in 10% horse-serum broth and in normal human saliva, as well as in broth-saline. With each, smears were made on glass slides in the usual way, allowed to dry and tested at intervals for the presence of virus. The proportion of virus which survived drying and its persistence were the same for broth-saline and for serum-broth. With saliva only 1% of that amount could be found after drying, perhaps owing to a direct destructive action on the virus by a lysozyme-like agent such as has been described by Burnet, Lush and Jackson (1939). In another experiment it was shown that reduction of the concentration of the virus by using, for impregnation, a 0·5% instead of a 5% suspension of lung had no effect on the proportion of virus that survived or its persistence.

VIRUS DEPOSITED IN A PARTICULATE FORM

In the experiments just described impregnation was effected by wetting the test materials completely. Under natural conditions, however, such gross soaking with infected secretions from influenzal patients is unlikely to occur, except perhaps with handkerchiefs and from expectoration. Contamination will be chiefly by droplets expelled during sneezing and coughing, and by droplet nuclei finally impinging on some surface. The findings so far presented probably apply to contamination by spitting and by the larger droplets, but it was considered necessary to confirm them by investigating the persistence of virus deposited as small particles or droplet nuclei. It was found that, when specimens of sheet were artificially impregnated with droplet nuclei, 10% of the amount of virus which could be demonstrated immediately after impregnation was still alive after one week, and after three weeks there was 1%. On the other hand, when droplet nuclei were deposited on a smooth surface inside a closed glass bottle, in one experiment no virus could be demonstrated after six hours, and in another, although virus was present after five hours, it could not be detected after twenty-four hours.

DISCUSSION

It has been shown that, when certain materials are impregnated with suspensions of influenza virus, as much as 10% of the virus can withstand the process of drying and can then remain alive for days or weeks at ordinary temperatures. After three days there may be little or no appreciable loss of virus; thereafter there is a steady decrease, between 1 and 10% remaining after a week. Minute dried particles containing influenza virus (droplet nuclei), such as are distributed by the coughing and sneezing of infected patients, can become attached to a material like sheet and persist in a similar manner, so that 10% may still remain alive after a week. These experimental results suggest that, if articles become contaminated with infective discharges from patients with influenza either directly or indirectly by means of droplets and droplet nuclei, appreciable amounts of virus may survive drying and persist for at least several days. In that case such articles are infective, for virus can reach a fresh host by direct contact or by the aerial transfer of dried virus on dust particles. Virus has been demonstrated on dust exposed near a ferret suffering from influenza. Unfortunately a similar demonstration of virus in the neighbourhood of human beings is not possible because of the low infectivity of such human strains for animals. Previous epidemiological experience with influenza has not suggested that dust plays any part in its spread, but further observations might be of interest in the light of these experimental findings. For reasons connected with the war the experimental investigation itself has had to be interrupted.

In certain other virus diseases evidence exists for believing that virus persisting in the dried state on dust and other articles may play some part in their spread. Infection by psittacosis has been reported in persons handling imported feathers (see van Rooyen and Rhodes 1940). Dried epidermal scales from cases of smallpox are regarded as infective, and their aerial transfer may carry the infection to a distance. With foot-and-mouth disease the results of detailed experimental investigation are available (Report 1927, 1931); these show that when dried on certain materials the virus can remain alive for several weeks. Hay treated with infective saliva was capable a month later of transmitting the disease to a calf which ate it. Storage in the light or at 37° C. had a lethal effect on the dried virus of foot-and-mouth disease, similar to that recorded here with influenza virus. The time of survival of the former varied greatly according to the material impregnated. With influenza virus, however, although only a few representative test materials were employed, no such differences were noted.

SUMMARY

An experiment is described showing that, after impregnation of a blanket with a suspension of influenza virus, the virus survives drying under ordinary atmospheric conditions and can be distributed in the air on dust particles by shaking the blanket.

Virus could be demonstrated on dry dust exposed near a ferret infected with influenza.

Results are given of a quantitative estimation of the amount of influenza virus that can withstand drying on a variety of materials including household dust. Between 1 and 10% was found to survive, but, if drying took place slowly in a humid atmosphere, as little as 0·01% survived.

The time for which the dried virus remained alive was estimated. There was little depreciation after 3 days, and 10% might persist for a week and 1% for a fortnight.

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Disappearance of virus was much more rapid when impregnated materials were kept at 37° C. or in the light.

The epidemiological significance of these findings is discussed and reference is made to other virus diseases in which a part is possibly played by dust and dried virus in the spread of infection.

I am grateful to Dr. M. Van den Ende for helping me to finish this investigation, and to Mr. R. E. Glover for his coöperation in the experiments with ferrets.

REFERENCES

Burnet, F. M., Lush, D., Jackson, A. V. (1939) *J. Path. Bact.* **49**, 241.
Crosbie, W. E. and Wright, H. D. (1941) *Lancet*, **1**, 656.
Report (1927). Report of the Foot-and-Mouth Disease Research Committee. 2nd Progress Report, London.
— (1931) 4th Progress Report, London.
Thomas, J. C. (1941) *Lancet*, **1**, 433.
Van den Ende, M., Lush, D., Edward, D. G. ff. (1940) *Ibid*, **2**, 133.
Van Rooyen, C. E. and Rhodes, A. J. (1940) In Virus Diseases of Man, Oxford.
Wells, W. F. and Brown, H. W. (1936) *Amer. J. Hyg.* **24**, 407.

CONTINUOUS ADMINISTRATION OF ETHYL CHLORIDE

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ETHYL CHLORIDE has been in use as a single-dose anæsthetic for over 40 years. The early anæsthetists recognised its dangers, which in addition to its toxic action on cardiac muscle are mainly due to its extreme volatility; this makes control almost impossible and overdosage all too easy. They regarded it as a drug whose administration required more skill and vigilance than was justified by its sphere of usefulness. In 1902 Guy[1] of Edinburgh found that ethyl chloride required a smaller effective dose, and was thus rendered safer, if given in combination with nitrous oxide, and devised a simple apparatus for induction of anæsthesia by this method. In 1911, Guy and Ross[2] produced another apparatus for administration of nitrous oxide and oxygen continuously, with addition of fractional doses of ethyl chloride as required. This apparatus is still used in Edinburgh for dentistry. Since 1911 no advance has been made, and ethyl chloride is still widely used but only in single doses.

For the past 15 months I have used ethyl chloride by continuous vaporisation with nitrous oxide and oxygen. The ethyl chloride was sprayed into the chloroform bottle of a Boyle or Walton apparatus in quantities varying from 5 to 20 c.cm. according to the anticipated duration of operation and resistance of the patient. Induction was with nitrous oxide; then, if relaxation was inadequate, ethyl chloride vapour was added gradually by slowly raising the lever of the chloroform bottle (with the plunger well raised in the Boyle apparatus). When relaxation was adequate the vapour was cut down to the minimum required for maintenance. Partial rebreathing was used and cyanosis avoided by adequate oxygenation. Results are shown in the table. By this method the anæsthesia was as easily controlled as when divinyl ether was used instead of ethyl chloride by the same technique. Cough did not occur, and apnœa and laryngeal spasm, so troublesome with ethyl chloride administered alone, were rare; when they did occur they were due to too rapid increase of ethyl chloride concentration and easily stopped by cutting it down a little and adding carbon dioxide. No appreciable drop in blood-pressure was noted even in patients already shocked; indeed, a sustained, mildly stimulating effect was produced in these. Recovery was rapid (1–10 min., as with divinyl ether), and postoperative vomiting only very slightly commoner than with divinyl ether. The period of recovery was taken as from cessation of anæsthetic to the time at which the patient could first give a coherent answer to the questions: "What is your name?" and "How old are you?"

Ethyl chloride by this method is particularly useful in cases requiring frequent painful dressings where nitrous oxide is insufficient; and in these cases after-pain is notably lessened.

1. Ross and Fairlie's Handbook of Anæsthetics, Edinburgh, 1940, p. 202. 2. *Ibid*, p. 210.

One particular terrified refugee, aged 13, who had had nine anæsthetics in her own country, was anæsthetised by this method on alternate days for 2 months. No premedication was given, no after-effects were seen, and the child ate a hearty meal within ½–¾ hr. after anæsthesia on most occasions, gaining ½ st. in weight in the 2 months. She had proved very resistant to ether, which caused prolonged vomiting.

The quantity of ethyl chloride used varied in each case, from 3 c.cm. for an operation lasting 10 min. in a fit adult male to 25 c.cm. for an operation lasting 1 hr. 10 min. in a similar subject, neither having had premedication. The cases were mostly casualties, and a large proportion had fractures, simple or compound, lacerations of varying extent and burns. The ages of the patients ranged from 4 months to 97 years. Opiates were used for adults only and were either morphia gr. ¼ with atropine gr. 1/100, or morphia gr. ⅛ with hyoscine gr. 1/200.

The method was found to be particularly useful for ambulant casualties, who, owing to rapid recovery and absence of pain or after-effects, were able to look after themselves and go home very soon after operation, thus saving much nursing attention and couch space in a busy department. It is, however, essentially a fine-adjustment method, and not to be lightly undertaken by the inexperienced, to whom anæsthetics in a casualty department are too often entrusted. In my view an experienced anæsthetist is especially necessary in a busy casualty department if as many cases as possible are to remain ambulant.

There were 2 deaths in the ethyl-chloride series, one from septic absorption following severe burns, 6 weeks after operation, and one in an infant aged 4 months, from bronchopneumonia after laparotomy for acute intestinal obstruction; this was the only post-operative chest case in either series. Four deaths occurred in the divinyl ether series, two from gas gangrene following extensive wounds, one 3 days and one 10 days after operation; and two with severe burns, one from secondary shock, 6 hours after operation and one 14 days after from toxæmia.

EXPERIENCE IN 51 CASES ANÆSTHETISED WITH ETHYL CHLORIDE, GAS AND OXYGEN, AND IN 61 GIVEN DIVINYL ETHER IN PLACE OF THE ETHYL CHLORIDE

—	Duration			Incidents		Sequelæ				
	Less than 15 min.	15–60 min.	Over 60 min.	Laryngeal spasm	Vomiting	Vomiting	Retching	Ptyalism	Headache	Noise and violence.
ETHYL CHLORIDE										
No pre-medication	19	11	2	1	1	6	3	1	1	5
Atropine only	2	4	0	2	0	1	1	0	0	1
Opiates ..	0	10	3	0	1	7	1	0	0	0
Total ..	21	25	5	3	2	14	5	1	1	6
DIVINYL ETHER										
No pre-medication	12	9	6	0	2	5	0	2	0	3
Atropine only	5	6	0	0	0	1	1	2	0	1
Opiates ..	3	17	9	0	2	4	0	0	1	1
Total ..	20	32	9	0	4	10	1	4	1	5

SUMMARY

A series of 51 cases anæsthetised with nitrous oxide, oxygen and ethyl chloride vapour are compared with a series of 61 cases in which nitrous oxide, oxygen and divinyl ether was given by the same method. The ethyl chloride (3–25 c.cm. according to the length of operation) was sprayed into the chloroform bottle of a Boyle or Walton apparatus, and anæsthesia was maintained for periods of 10–70 min. Adults received morphia and atropine or morphia and hyoscine before induction.

The patients were mainly fit, ambulant casualties, but some were shocked, with extensive injuries.

Postoperative sequelæ were few and transient, and constitutional disturbance minimal.

Ethyl chloride seems to be brought under control by this technique, but requires the same constant watchfulness which is necessary during the administration of chloroform.

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THE KONDOLÉON OPERATION FOR CHRONIC LYMPHŒDEMA

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IN a limb swollen by chronic lymphœdema the lesion is confined to the tissues above the deep fascia, and however large the limb may become there is never any œdema below this fascia. The pathology of the condition is in the main unknown, but it is evident from the delay in the excretion of dye injected into these limbs that the normal channels of lymph return are choked. Hence, surgical intervention has been directed in various and often ingenious ways towards establishing some form of alternative channel. It is no doubt true that this is the only approach which promises any permanent good, since other methods, such as rest, massage and support, yield nothing but the most ephemeral improvement.

In the attempt by surgery to develop alternative channels buried materials such as silk threads have been used, efforts have been made to drain the lower limb into the peritoneal cavity via the crural canal, and trial has been made of flaps of normal skin transplanted to form a bridge between the diseased area and the nearest normal tissues. Such attempts have not made good; after a temporary improvement any benefit is lost by the formation of scar tissue. Some continental writers have reported success after sympathectomy. This, however, has not been our experience, and we have shown [1] that the operation of lumbar-cord ganglionectomy has failed to secure any permanent improvement in chronic lymphœdema.

The sole method which today seems worth while is that associated with the name of Kondoléon. Normally, as was first shown by Sappey, there is no lymphatic communication across the deep fascia, and the object of the Kondoléon operation is to develop, by hiatus of the deep fascia, a free interchange between the diseased area and the unaffected intermuscular lymphatic channels. The original conception is due to Lanz who, in a patient with lymphœdema of the thigh, cut long strips of the deep fascia, and leaving these attached by one end fixed the free ends into holes drilled in the shaft of the femur. Kondoléon left the fascial strips attached by one end and plunged the free ends into the intermuscular septa, but the more recent practice has been to excise long and wide strips of the deep fascia together with a wedge-shaped area of the overlying œdematous tissue.

It is, of course, likely that the success of the Kondoléon technique will, as in older operations, be hampered by the formation of deep scar tissue. It is, therefore, the more necessary that the operation be not judged on its immediate effect, but only after a long period.

With this object, we have recently examined 11 patients, 2 men and 9 women, on whom we have done the Kondoléon operation during the last 8 years. In all these patients the operation was done for lymphœdema of the lower extremity. We have excluded from this review a number of patients in whom the operation was done less than a year ago.

Operation.—An adequate Kondoléon operation implies a long incision stretching on the outer side of the limb from the trochanter to the external malleolus, and on the inner side from the level of the saphenous opening to the internal malleolus. These incisions should be interrupted for 3 in. at the level of the knee, and the inner incision will, of course, be planned to avoid the internal saphenous nerve and vein. We have found it best to carry the incision at once through the deep fascia. By everting the edges of the incision in the fascia it is possible easily to cut a wide strip of fascia and overlying tissue from each side of the incision. The wound is closed with particular care to hæmostasis; no drain is necessary and the bandage should be firmly applied.

RESULTS

If return to normal is expected of the operation, the results are disappointing. In but 2 of our cases has this fortunate result been approached, and it is interesting to note that both cases were of post-traumatic origin, dating in each instance from a comparatively slight injury inflicted 6 years before the operation. The end-results in the 11 patients do, however, show some gratifying features. In all but 1 patient there has been no further increase in the girth of the limb, and it is pleasing to note that in no case has there been any further upward extension of the disease. Many measurements of these limbs have been made under comparable conditions, always in the mid-afternoon after reasonable exercise, and these show in 10 of the 11 patients a reduction in girth of ½–2 in. In all, 7 patients state that they have been able to return to work and have lost the pain and discomfort which formerly rendered them incapable of sustained effort. One says that "although the leg may swell after exercise as much as before, it goes down ever so much more quickly." This statement is interesting as affording some evidence that the operation has succeeded in its object of securing a by-pass for the lymphatic flow.

We think it fair to evaluate the Kondoléon operation as follows. It will not secure a return to normal, but it will, as a rule, reduce the girth of the limb by some 25–30% of its increase; and, what is more important, it appears to stop further extension of the disease. It is likely to succeed in relieving the pain and discomfort of the heavy limb and may allow of a return to work. For these reasons we think the operation is worth while. It is safe and easy, and in the present state of our knowledge is the only operation which can hold out any prospect of improvement.

SUMMARY

Eleven patients on whom the Kondoléon operation has been performed have been observed for periods of 2–8 years.

The results show that the operation, although not likely to yield a complete cure, produces improvement which justifies its use for cases of chronic lymphœdema.

1. Telford, E. D. and Simmons, H. T. *Brit. J. Surg.* 1938, **25**, 765.

FURTHER EXPERIENCES WITH SULPHAPYRIDINE IN FILARIASIS

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SINCE the publication of a series of cases of filarial complications, successfully treated with sulphapyridine (Earle 1941a, b) some further cases have been treated and the results seem worthy of record.

Lymphadenitis.—The strikingly beneficial effect of sulphapyridine on the lymphadenitis complicating filariasis probably indicates that the complication is due to secondary streptococcal infection rather than to the filariasis itself. No diminution in the number of microfilariæ of the blood-stream is produced by the drug.

CASE 1.—A Nauruan woman aged 40. First seen on Jan. 2, 1941, when she complained of fever and pain and swelling in the left popliteal space of two days duration. There was a past history of several similar attacks. She was a sturdy woman, with no abnormalities save enlarged tender glands of the left popliteal space. The overlying skin was tense and dark red. There was no enlargement of the crural, inguinal or any other lymphatic groups. No septic foci were found on the left leg or foot. Microfilariæ were found in the blood. Local treatment produced no relief, and on Jan. 6 sulphapyridine (M. & B. 693) was begun, being given four-hourly. The first two doses were 2 g. each and the remaining eleven doses were each 1 g. This course was repeated. The temperature fell to normal and the local pain and swelling diminished within twelve hours of beginning treatment.

Cellulitis complicating elephantiasis.—Devitalised elephantoid tissue is subject to recurrent secondary invasion. In such conditions sulphapyridine is particularly useful, though it does not act on the elephantiasis or the underlying filariasis.

CASE 2.—A Nauruan woman aged 25. First seen on Jan. 6, 1941, when she complained of extreme pain and swelling of the left leg, of three days duration. She was otherwise healthy except for severe elephantiasis of the left lower limb. The elephantoid swelling reached up to the level of the knee.

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Superimposed was a severe cellulitis, extending upwards to the lower third of the thigh. Microfilariæ were present in the blood at night. Sulphapyridine, eleven doses (two of 2 g., the remaining nine of 1 g.), was begun on Jan. 6, and the course was repeated. There was rapid disappearance of the cellulitis but no alteration in the appearance of the original elephantiasis.

CASE 3.—*Cellulitis and filarial myositis.* A Nauruan man, aged 60, first seen on Jan. 4, 1941, complained of fever and pain in the right leg. He was rather emaciated, with no lesions in the cardiovascular, pulmonary, alimentary or central nervous systems. There was elephantiasis of both legs and the left forearm. In addition, cellulitis was present in the right leg and thigh. No microfilariæ were found in the blood. Sulphapyridine in courses similar to those given in cases 1 and 2 produced lysis of the temperature. The local inflammatory reaction subsided concurrently. On Jan. 14 a further swelling of the right calf was observed but this time the swelling was beneath the elephantoid tissue, in the calf muscles. Sulphapyridine was again given but this time did not produce any response, even when repeated. Since the pain was becoming intolerable an incision was made and dark greenish pus evacuated. The patient made a slow recovery.

This case again illustrates the fact that, while sulphapyridine acts rapidly on secondary infection, it is inert on filariasis itself. The second swelling was undoubtedly due to a filarial myositis which is uninfluenced by sulphonamides. In this variety of myositis the blackish-green pus is usually sterile (Quin 1941), thus differing from true tropical pyomyositis, where culture of the pus yields staphylococci (Hughes 1938), and in which sulphapyridine has a well-marked curative action (Earle 1939).

I wish to thank Dr. B. H. Quin, senior Government medical officer in the administration of Nauru, for permission to publish this paper.

REFERENCES

Earle, K. V. (1939) *Trans. R. Soc. trop. Med. Hyg.* **33**, 169.
— (1941a) *Brit. med. J.* **1**, 476.
— (1941b) *Med. J. Aust.* 1941, **2**, 200.
Hughes, W. (1938) *Quart. J. Med.* **7**, 537.
Quin, B. H. (1941) Personal communication.

BIATRIAL TRILOCULAR HEART
WITH ATRESIA OF THE MITRAL VALVE

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Cor biatriatum triloculare with atresia of the mitral valve is seldom encountered. Dudzus (1922) described a case and in his account of the specimen included a short summary of 11 published cases. Since then only 2 further cases have been recorded (McIntosh 1926, Abbott 1932). In his Hunterian lectures on malformations of the heart, Keith (1909) did not include this type of congenital cardiac abnormality, but at one point, while discussing the occurrence of cor biloculare, mentioned that he had seen 3 cases in which the hearts, all from stillbirths, showed mitral atresia in association with extremely minute left atria. Whether these cases were in other particulars similar to true cor biatriatum triloculare with mitral atresia is not made clear.

CASE-HISTORY

The infant was admitted to hospital at the age of 11 weeks. She was fairly well nourished but her colour was poor, lips and nose being cyanosed. For several days she had been disinclined to feed and had been coughing a great deal. During feeds she became very blue but attacks of cyanosis occurred independently of feeding, being followed by pallor. The chest showed signs of considerable inflammatory congestion. The heart was slightly enlarged; the sounds were pure and of good quality at the apex, but at the base only one sound could be heard, a tapping preceded by a short murmur. The child became increasingly cyanosed and sunken-looking and died aged 14 weeks 2 days. While in hospital the heart-rate varied between 130 and 160 and the respirations between 30 and 60.

The findings at autopsy confirmed the diagnosis of the chest condition but otherwise revealed nothing of note except in the heart, in which there were three chambers, two atria and one ventricle (cor biatriatum triloculare). The single ventricle, in which no trace of a septum could be found, communicated by a large tricuspid opening with the right atrium but no left atrioventricular opening was present. Leading from the common ventricle was a single arterial stem, guarded by three semilunar cusps, on the dorsal wall of which was a well-marked ridge. This ridge represented the septum which normally divides the truncus arteriosus into aorta and pulmonary artery. The pulmonary artery was here found to arise from the aorta on the right side of the septum; thus not only did this case show an undivided truncus arteriosus but the aorta and pulmonary artery as developed were transposed (fig. 1). The coronary arteries were derived from a single vessel which arose from the aorta some distance above the origin of the pulmonary artery and descended to the coronary sulcus alongside the truncus arteriosus.

The right atrium, which was of normal size, received the superior and inferior venæ cavæ and the coronary sinus, and communicated, as mentioned, with the common ventricle by a large tricuspid opening. This opening seemed identical with a normal right atrioventricular valve. The left atrium, also of normal size, received the four pulmonary veins, but no opening into the ventricle existed, there being complete atresia of the mitral valve. The interatrial septum presented a patent foramen ovale, 3 mm. by 1·5 mm., bounded by very clearly marked primary and secondary septa, and in addition a smaller foramen, 2 mm. in diameter, situated below the fossa ovalis (fig. 1). Numerous established cases of persistent ostium primum of Born were compared with this foramen but it does not appear to be an example of that condition;

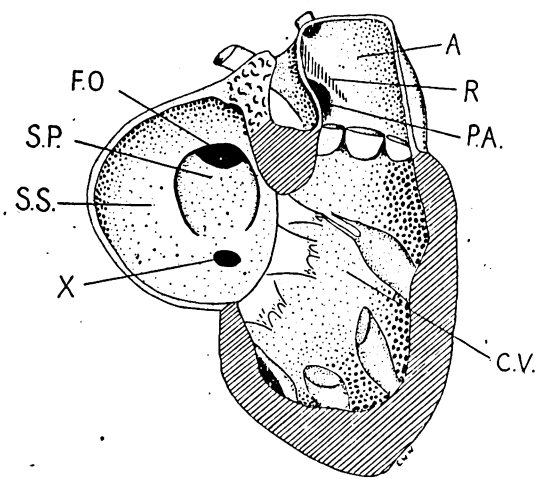

FIG. 1—Heart opened from in front; atrial septum shown from the right side. F.O. = foramen ovale; S.P. = septum primum; S.S. = septum secundum; X. = secondary foramen; A. = aorta; P.A. = pulmonary artery; C.V. = common ventricle; R. = ridge representing septum of truncus arteriosus.

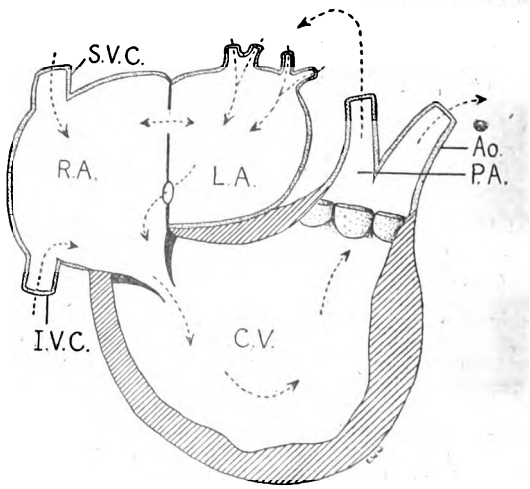

FIG. 2—Presumed circulation; in the atrial septum the foramen ovale is above and the secondary foramen below. S.V.C. = superior vena cava; I.V.C. = inferior vena cava; R.A. = right atrium; L.A. = left atrium; Ao. = aorta; P.A. = pulmonary artery; C.V. = common ventricle.

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more likely it was secondarily produced by back pressure from the left atrium owing to the mitral atresia.

The circulation in this case must have been as represented in fig. 2 and that being so, survival for 3 months is remarkable.

I wish to thank Dr. Mary Stevenson, in whose wards in Stobhill Hospital, Glasgow, the patient was seen, and Prof. D. M. Blair for advice and criticism.

REFERENCES

Keith, A. (1909) *Lancet*, **2**, 359, 435 and 519.
Dudzus, M. (1922) *Virchows Arch.* **237**, 32.
McIntosh, C. A. (1926) *Amer. Heart J.* **1**, 735.
Abbott, M. E. (1936) Atlas of Congenital Cardiac Disease, New York.

Reviews of Books

Psychoanalytical Method and the Doctrine of Freud

ROLAND DALBIEZ, Dr. ès lettres. London: Longmans, Green and Co. Pp. 515 and 331. 2 vols. 40*s*.

To the people—many of whom are not psycho-analysts—who admire the lucidity of Freud's style it must come as a surprise that anyone should write two volumes because he finds Freud incapable of presenting his thought in a convincing form or of making a clear distinction between his method and his doctrine. In the first volume Dr. Dalbiez presents the theory of psycho-analysis, and in the second expresses his own views. He consistently points out the relations of Freud's views to those of other workers, and his approach is partly historical; thus he recalls the war waged by Hughlings Jackson and Head against the anatomical theories, and their insistence on the need to think physiologically; Freud showed that we must, in addition, think psychologically. Contemporary theories are also contrasted with those of Freud. Janet's view centred on the negative idea of deficiency, whereas Freud insisted on the positive idea of conflict, and he took up the neurological approach to hysteria at the point where Babinski left it. Since he is by training a philosopher, a pupil of Meyerson whose views are outlined in a discussion on the historical and scientific methods in psychology. Dr. Dalbiez regards psycho-analysis as a discipline not of the type of the sciences, which explain the particular by the general, but of the type which, like history, explain an event by an antecedent event. He does not consider psycho-analysis to be a philosophy in itself. His discussion of Pavlov's work in relation to Freudianism shows his original perspective: he concludes that the conditioned reflex can be regarded as a psychological concept and as such lends support to Freudian views on psychic mechanisms and their dynamic and unconscious nature.

Most critics of psycho-analysis, he considers, fail, like Freud himself, to distinguish between method and doctrine, and the whole first volume is merely preliminary to a chapter in the second volume where the associative method is thoroughly examined. He holds that the method, correctly applied, can produce scientifically accurate results, but he criticises the doctrine freely, and eventually concludes that the fundamental problems of the human soul are left untouched by psycho-analysis. He accepts, however, many points in the Freudian theory. Thus he agrees that infantile sexuality must be regarded as normal, and that there is a genetic link between this and the sexopathies; but he considers that Freud has failed to make the philosophical distinction between "accidental" and "essential." Thus for the polymorphic perversion attributed by Freud to the infant Dr. Dalbiez would substitute polymorphic pervertability. Elsewhere he points out the difficulty of accepting the Freudian theory of dreams.

In contrasting Bergson's theories of habit and memory with Freud's Dr. Dalbiez suggests new paths of inquiry. The part played by memory in the Freudian method would repay close attention, especially if the dynamic nature of memory was kept in mind. Plenty of clinical examples, drawn from various authors, are quoted in the two volumes. One or two assertions are based on insufficient evidence: thus Dr. Dalbiez accepts Peiron's claim, which would be questioned by most physiologists, that a toxic substance—hypnotoxin—can be demonstrated in the blood and cerebrospinal fluid. The work, however, is a brilliant example of Gallic logic and conciseness, and the translation is worthy of them.

Tropical Tips for Troops

Lieut.-Colonel E. T. BURKE, M.B. Glasg., officer commanding 40th Field Ambulance, XIII Division, 1914–19 in Gallipoli, Egypt, Mesopotamia, N. Persia, the Caucasus and Transcaspia. London: W. Heinemann Medical Books. Pp. 63. 2*s*. 6*d*.

Colonel Burke intended this small paper-backed booklet for the use of officers and men of our armies in those regions loosely called "the tropics"—regions which embrace, among others, parts of Europe, Egypt and the Near East, and South Africa, as well as the geographical tropics. The text is divided into five chapters advising on tropical kit, protection against the sun, tropical diseases, vermin and mental readjustment. There are one or two unexpected omissions; for example, the advantages of "long shorts" and of mosquito boots are not mentioned; while the recommendation to wear a cholera-belt may not find universal acceptance. In the second chapter, the malignancy of the tropical sun is perhaps overdrawn, but the chapter on tropical diseases contains much information of value to laymen. Bilharzia is not mentioned, though it is surely of even greater importance to troops in the field than plague, to which a section is devoted; relapsing fever—particularly the Central African variety—and its vectors might also have found a place. The chiggoe flea, too, is a minor parasite which may assume major importance in the military field; and a few words on ticks would round off the chapter on vermin. The section on mental readjustment contains much wisdom. This little volume should be of considerable value to those about to embark on military expeditions abroad, and it will be in large demand.

Modern Dermatology and Syphilology

S. WILLIAM BECKER, M.D., associate professor of dermatology and syphilology in the University of Chicago; and MAXIMILLIAN E. OBERMAYER, M.D., assistant professor of dermatology and syphilology in the university. London: J. B. Lippincott Co. Pp. 871. 65*s*.

THIS new textbook presents many original features. The paper and illustrations are excellent while the two columns of printing to a page are restful to the eye. The authors give their considered opinions in lecture form; inevitably the reader will disagree with some of these opinions, but he will find them far more stimulating than a dull recital of facts. References in the text are cut down to the minimum and an adequate bibliography is to be found at the end of each section. Plenty of space is given to treatment—which should appeal to the practitioner, who most often consults textbooks to find out what to do. No space is wasted on obsolete methods. In the treatment of syphilis, the recommendation that neoarsphenamine should be given every five days must be criticised. The seven-day interval has proved satisfactory and it is better for patients on a long course of treatment, particularly those attending clinics, to report at the same time each week; with five-day intervals treatment will periodically fall due at the week-end, and patients will tend to default at those times.

Year Book of Public Health, 1941

J. C. GEIGER, M.D., Dr.P.H., director of public health of San Francisco. Chicago: Year Book Publishers; London: H. K. Lewis and Co. Pp. 544. 15*s*.

THIS is one of a series of year books, on various departments of medicine, founded in 1900 and since continued annually. The present volume, without preface or introduction, deals with recent papers on a great variety of public-health subjects, each with a footnote by the editor. The matter is extracted mainly from current American publications, but due attention has been given to important contributions to British journals. The selection is guided by the importance of the papers to the progress of the science and practice of preventive medicine, with a bias towards those which throw light on controversial subjects or which raise new contentions. It is thus a valuable guide to the progress made in the past two years. Though in some places tinctured by American laws and methods, most parts of it will have equal value all over the globe. Of topical interest is the chapter on military hygiene, or more correctly war-time

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hygiene, since in the present war problems are mainly connected with the civil population. The book should have special value to British medical practitioners who are finding that war-time restrictions on imported literature make it difficult to keep abreast of recent advances in knowledge.

Medical Societies

ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the Section of Obstetrics on Oct. 17, with Mr. SETON PRINGLE in the chair, a presidential address on

Placental Infarcts

was read by Dr. N. M. FALKINER. He recalled the work published in 1914 by James Young, who accurately described the red infarct and drew attention to its association with eclampsia. Recently workers in America, especially Bartholomew and his colleagues, have revived Young's views. Careful examination of placentas from all toxæmic cases have resulted in the recognition of certain types of placental infarct in association with different clinical manifestations. It has been shown that placental infarcts of the more acute types are definitely associated with the toxæmias of pregnancy, and it is possible to predict the type of infarct that will be found in the placenta from the clinical history. With the experience of examining placentas as "unknowns," it has been possible to establish criteria for an exact classification of placental infarcts and their relation to toxæmia. Bartholomew has put forward hypotheses with regard to the significance of hypocholesterolæmia and hypothyroidism as predisposing to infarcts in the placenta. Young and Bartholomew agree as to the ætiological significance of the acute placental infarct in toxæmias, but differ in their interpretation of the causal factors producing these lesions. Dr. Falkiner showed sections from 20 cases of toxæmia of pregnancy and demonstrated the constant occurrence of acute infarcts in pre-eclampsia and eclampsia and that the older or more chronic infarcts are associated with nephritic toxæmias.

Dr. GIBBON FITZGIBBON said he had found a few infarcts, but had more or less discounted them as causative elements in the toxæmias of pregnancy.

Dr. BETHEL SOLOMONS urged that a series of placentas from normal cases should be compared with a series from toxæmia cases. He asked if autopsies have been done on cases where the uterus has been removed with the placenta in situ, for these might shed new light on the decidual circulation. The relation of infarcts, and a good or bad decidual circulation, to toxæmias is, he said, still an unsolved puzzle; the general belief is that when infarcts are present with good decidual circulation the toxæmia is more severe.

Dr. JOHN CUNNINGHAM referred to the great delicacy of the vessels in the placenta, and said that the rate of growth of these vessels is enormous. When growth is as rapid as this something is bound to go wrong sometimes, and this to some extent explains the development of infarcts. The most interesting question is whether the toxæmia is due to the infarct or the infarct due to the toxæmia. He personally thought that the infarct is due to the toxæmia. In cases of chronic nephritis and vascular hypertension it is not unreasonable to expect that the new blood-vessels in the placenta will be especially affected.

Prof. A. H. DAVIDSON thought the chief question was: does infarction come from the maternal circulation or from the fœtal circulation? He thought that it comes from the latter. During his time as master of the Rotunda Hospital a number of babies born of toxæmic mothers showed albuminuria, which suggested that they had nephritis.

Dr. R. M. CORBET said that if, as Bartholomew and his co-workers maintain, the fœtal vessels are primarily affected, there must be a hypercholesterolæmia in the fœtal circulation; the question might also be raised why the fœtus is not always affected to the same degree as the mother. Dr. Falkiner suggested that when the infarction is acute the whole cotyledon is involved. If this is so, the toxins liberated may not be absorbed by that cotyledon, but will be carried upwards in the maternal bloodstream to the subchorionic pool where there is little or no absorption, and thence into the general circulation, where they may be taken up by the maternal tissues before the blood returns to the placenta, hence leaving the fœtus unaffected.

Dr. J. S. QUIN thought that if these lesions are the cause of the toxæmia the case of toxæmia from severe accidental hæmorrhage which Dr. Falkiner mentioned must demand another explanation. Whether the toxæmia is maternal or fœtal in origin, Dr. Falkiner considered considered that both the maternal and the fœtal circulations were involved. How does the separation of the placenta in these cases compare with the appearance of the infarcted areas in a recent infarction?

Dr. W. R. F. COLLIS had observed that in every case where there was toxæmia in the mother there was toxæmia in the baby as well. Wherever the toxin is it certainly gets into the fœtal circulation. He asked what is the mechanism of the actual thrombosis. Is it fœtal or maternal?

In his reply Dr. FALKINER said that this work is still going on. The decidua had not been examined in any case. It is very difficult to examine the decidua in the placental circulation. There are reasons to back up the view that disturbance of the maternal circulation will cause infarction. The greater proportion of patients who develop sugar in the urine during pregnancy develop albuminuria.

AMERICAN UNIT AT WORK

THE American Red Cross Harvard field hospital unit, planned for the investigation and treatment of infectious diseases under war-time conditions, is now at work. Soon after war broke out Harvard University offered to send a field and laboratory unit to England to study epidemiological problems. The offer was accepted, and in August, 1940, Prof. J. E. Gordon of the Harvard medical school came here to confer on the details of organisation. It was decided that a hospital should be included, and at the invitation of Harvard the American Red Cross agreed to provide hospital buildings and equipment and recruit nursing and administrative staff. To assemble personnel and equipment and move them across the Atlantic naturally took time. Now, however, a year after the development of the plan, transport of equipment and staff has been completed and the construction work is nearly done. There are twenty-two buildings, connected by covered walks, each building having its own oil-burning central-heating system. Beds are provided for 125 patients, over 40% of them in single rooms, the remainder in two-bed rooms. The hospital is affiliated with the Emergency Medical Service, and receives both military and civil patients. One building is especially designed for admitting and discharging of patients; new arrivals are examined and in some instances treated in this building before being transferred to a bed in the main hospital. Those ready to be discharged are brought back to this building for tub bath and return of clothing. In other buildings are staff quarters, laboratories, operating-theatre, X ray, laundry, kitchen, dining-room, store-rooms, garage, offices and recreation-rooms. The laboratories are well equipped for diagnostic procedures and research in infectious disease. Personnel brought from America includes 60 nurses, 8 physicians, 6 laboratory technicians, 3 secretaries, a hospital superintendent, a dietitian and a chef. Other employees are British. The aim of the unit is to attack problems of infectious disease by mean sof field study, laboratory investigation and clinical observations. Field units consisting of physicians, technicians and public health nurses will be available for work in any part of Britain. Cars and other equipment for mobile operations have been provided. These units are being used to supplement local health organisations in times of need, and such help will be welcome now when local agencies are often reduced in staff and burdened with extra war duties. So far as is practical the base will be used by the field unit for laboratory work and for supplies. Actual projects in which the unit is engaged must of course depend largely on circumstances, but infections of the central nervous system and the pneumonias are special interests of members of the staff.

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THE LANCET
LONDON: SATURDAY, NOVEMBER 29, 1941

TYPHUS IMMUNISATION

THE war has now entered countries where exanthematic typhus is both endemic and epidemic and where frequent and efficient delousing will be difficult if not impossible to carry out. Typhus is endemic on the Russian front from the Caucasus to Finland, although epidemic proportions have not yet been reached. Much of the disease described in the English newspapers as typhus is undoubtedly typhoid, which in German is known as typhus abdominalis. Nevertheless there seems to be an urgent need for effective immunisation if the history of the Serbian army in the last war is not to be repeated. On a later page will be found a note on the precautions regarded by the Ministry of Health as essential should infected lice reach this country.

Unfortunately little is yet known about typhus immunisation on a large scale. The only vaccine which has been in use for any considerable time is that of WEIGL. This is made from the intestines of lice infected with typhus rickettsiæ inoculated per rectum. Three to four injections of the vaccine are necessary to produce immunity while some hundreds of lice are required for the immunisation of one person. Apart from the delicate technique of rectal injection this method therefore requires a large staff of immunes on whom the lice can be nourished. It is thus hardly practical unless a whole institute is devoted solely to the manufacture of the vaccine, as was done at Lwow under the direction of Professor WEIGL. It is known that WEIGL remained when the Russians occupied this town in 1939 but nothing has been heard of his fate and that of his institute since the beginning of the Russo-German conflict. The only other method of immunisation used on a large scale has been the injection of living murine typhus rickettsiæ in Morocco and Tunis. These rickettsiæ, when living, undoubtedly immunise against exanthematic typhus but often at the expense of an attack of murine typhus which though not so deadly as the exanthematic form is not to be despised. The use of living murine rickettsiæ as a vaccine is also contra-indicated in countries where lice are widely distributed in the population, for then the stage is set for the possible conversion of murine into exanthematic typhus rickettsiæ by passage through the louse. The possibility of using killed murine typhus rickettsiæ has been envisaged by RUIZ CASTANEDA,[1] who finds that in guineapigs multiple doses do produce some immunity. On another page Dr. G. M. FINDLAY shows from personal experience that the converse is also to some extent true, and that at any rate a partial immunity is produced in man against murine typhus by killed exanthematic typhus rickettsiæ. In dealing with exanthematic typhus, however, it seems far better to employ the killed homologous rickettsiæ, provided these can be obtained in sufficient quantities. Two methods have recently been put forward for obtaining antigenically rich vaccines of exanthematic typhus rickettsiæ. COX[2] has injected rickettsiæ into the yolk sacs of developing chick embryos while DURAND and GIROUD[3] have instilled rickettsiæ intranasally into mice. From the yolk sac or the mouse lung, after treatment with formalin or phenol, vaccines may be obtained containing very large amounts of killed rickettsiæ. To confer immunity, however, it seems essential to give four or five injections. Both these vaccines have been employed on a small scale in man but their actual value as immunising agents is at present unknown. Cox's egg-yolk vaccine was employed during the recent small epidemic in Spain but the results are as yet unpublished. It is known that laboratory workers who have been immunised by the egg-yolk vaccine have subsequently become infected with exanthematic typhus; in these cases of course there was probably a more intense infection and a longer exposure than is likely to occur under conditions in the field. A drawback to the use of the mouse lung vaccine is obviously the possibility that other viruses present in the mouse lung may remain active in the presence of the disinfectant employed. This possibility may be reduced by employing special laboratory-bred strains of mice.

Before typhus immunisation is attempted on a large scale in the field certain fundamental questions must be answered—what is the minimum number of injections that produces immunity and the length of time for which immunity persists, and what are the keeping properties of the vaccine? In immunising large numbers of people it is not easy to ensure that all receive four or five injections at intervals of 5–7 days, so that if possible the number of injections should be reduced to one or two. In regard to the duration of immunity it is known that with Weigl's louse vaccine, as with the tick vaccine prepared against Rocky Mountain spotted fever, reinoculation every year is essential. Incidentally in testing immunity reliance should not be placed solely on the Weil-Felix reaction; the agglutination test and the demonstration of rickettsicidal antibodies by the intradermal injection in rabbits, as devised by GIROUD,[4] should also be employed. Finally there is already evidence that after 5–6 months in the ice-chest both Weigl's vaccine and the mouse-lung vaccine lose much of their antigenic power. Presumably if kept at room temperatures their loss of antigenicity would be even more rapid.

INDUSTRY'S CLAIM ON MEDICINE

"THE months that lie immediately before us," says the Minister of Labour, "will be as crucial a period as that of the Battle of Britain," and he has appealed to industry to increase its output by 30 or 40 per cent. His appeal is a challenge to the medical profession, and in particular to those doctors who having appointments in factories can help to ensure optimum effort. The question of optimum hours, Mr. BEVIN has said, is not so much one of bargaining between trade-unions and employers as one demanding a scientific approach which takes account of all the factors involved at any given time and recognises the need for adjustment as those factors change. Surely one scientific approach

1. Ruiz Castaneda, M. *Brit. J. exp. Path.* 1941, **22**, 167.
2. Cox, H. R. *Publ. Hlth Rep. Wash.* 1938, **53**, 2241.
3. Durand, P. and Giroud, P. *Arch. Inst. Pasteur Tunis*, 1940, **29**, 25, 234.
4. *Bull. Soc. Path. exot.* 1938, **29**, 25; **31**, 245.

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must be that of medicine as a whole, the combined wisdom of all who have the privilege of supervising the health of the workers. The effects of abnormal hours on health are known; they have just been set out [1] again with authority by a select committee, but we need more observations on the effects of different work spells. Admittedly, excessive overtime for a long period has a devastating effect on the human reserve of strength, both physical and mental. Over short spells of a month or two, or even three as after Dunkirk, effort can be greatly intensified without collapse. But over six months, the precise period mentioned by Mr. BEVIN, it would be folly to drive factory workers blindly, without regard to rest and recreation. Production is by no means directly proportional to the number of hours worked; the optimum hours for regular output are far less than those which can be maintained in a spurt. The problem with which we are faced is to find the correct work spell for each group of workers, for each gang, for each process, for each department, and for each firm. Fatigue, that scientifically vague yet expressive word used to sum up the results of overwork, can at present only be measured in terms of output; if fatigue appears in the individual, in the squad, in the gang, in the shop, then production falls. And because fatigue is cumulative it follows that the national effort must decline if the rules so truly laid down by the Health of Munition Workers Committee in the last war, and amply confirmed by later experience, are not applied by those in authority.

How is this to be done? The first step is to apply existing knowledge and this is now, we are assured, the firm intention of the Government as stated in the report mentioned above and summarised last week in these columns (p. 648). No longer is the accumulated wisdom of the Industrial Health Research Board and its forerunners in regard to the relation of working hours to output, tested again and again and proved right every time, to be set aside by the producing departments. Patriotism is not enough; we can be ruthless with materials but not with the human tools that fashion them. To ensure the perfect adaptation of workers to their work would no doubt require an industrial medical service with a code and practice as elaborate as (say) that of the school medical service. But, as the B.M.A. report [2] published today insists, an adequate medical service does not necessarily involve an elaborate and expensive organisation. Last year's order of the Ministry of Labour paved the way by giving the Factory Inspectorate discretion to introduce doctors, nurses and welfare officers into any factory engaged on armament work. There should be, says this report, in *every* factory, large or small, arrangements for the medical supervision of the workers. Before the war there were in this country some 520 factories employing a thousand or more workpeople, and 137,000 employing less than 250. It should be possible for a group of smaller firms to coöperate in appointing a medical officer who will spend his whole time in industrial medical work; and there is much to be said for having some advisory body to help the employer get the kind of medical officer who can safely be given a free hand when appointed. The proper placing of workers according to their fitness, their continued supervision under working conditions after return from illness, study of the occupational hazards and the best way to meet them, a careful watch on the beginnings of psychoneuroses—these form the background of a job which might well become as attractive as that of the public-school famulus. And to become this the works medical officer must be left to develop his style unhindered, with direct access to the management when he needs it. The Association of Industrial Medical Officers has also devised a training scheme which it regards as practicable even in war-time, by which special university committees, including doctors, employers and trade-union officials shall arrange courses in industrial medicine and obtain facilities for entry into all kinds of factories. Actually the interest of the general practitioner in the subject is being much quickened these days and there is a good prospect, if the war goes on long enough, of the doctor regaining the intimate knowledge of his patients' daily lives that he lost when they entered the erstwhile gloomy portals of the factory. This new awareness will provide the clue to the "research" which is regarded as something apart and out of the question at present. Its essential basis will be what industrial life looks like to doctors who move freely within it.

1. Statement relating to Production, being the 25th report of the Select Committee on National Expenditure. H.M. Stat. Office. 6*d*.
2. Report of Committee on Industrial Health in Factories. B.M.A. House. Pp. 43. 6*d*.

PHOTOGRAPHY THROUGH THE PERITONEOSCOPE

As early as 1901 the abdominal viscera of a dog were seen through a cystoscope introduced into a pneumoperitoneum. Since then the peritoneoscope has been much improved, and the latest triumph is the perfection of a method of colour photography which makes it possible to attach a coloured picture of his abdominal organs to the patient's clinical notes. Yet the enthusiasts for peritoneoscopy are still few, and there seem to be three reasons for this lack of favour: the procedure may be accounted unsafe; its scope may be too limited; or the alternative (usually exploratory laparotomy) may be considered so much more satisfactory that any added risk is considered worth while. From published accounts the dangers of peritoneoscopy do not seem alarming. GARREY [1] has reported 75 peritoneoscopies without a complication, except for slight sepsis in the abdominal wall of one case. His patients were, on an average, 36 hours in hospital. He discusses the experience of other observers, notably of RUDDOCK, who has completed 1500 examinations, and concludes that peritoneoscopy has only a fraction of the mortality of laparotomy, while it saves money and hospital beds. The first part of the operation is the induction of a pneumoperitoneum. An area in the midline of the abdominal wall about 5 cm. across, just below the umbilicus, is anæsthetised by procaine infiltration. An incision 1·5 cm. long is made through the skin; and a small blunt trocar and cannula are inserted through which the pneumoperitoneum is induced. The larger cannula which is to act as the sheath for the optical instrument is introduced through a nick in the anterior fascia. GARREY gives as the essentials for the patient's comfort during the procedure gentleness in all movements—no jolting and no touching of visceral surfaces by the instrument. He

1. Garrey, W. E. *New Engl. J. Med.* 1941, **225**, 180.

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also exercises great care in anæsthetising the parietal peritoneum. Intra-abdominal photography, described by HORAN and EDDY,[2] is also done under local anæsthesia. A conscious patient is almost an essential, for during the exposure the breath has to be held. The main obstacle encountered at the outset was that the lamp supplied with the peritoneoscope was an insufficient source of light, so that a very small lamp with a very powerful beam had to be invented. According to present technique this lamp must be introduced through a separate peritoneal opening, but a trocar is being designed which will carry both peritoneoscope and light-carrier through two air-locks.

The value of peritoneoscopy depends on the possibilities of extending its scope. Up to now it has been useful in the differential diagnosis of liver diseases, in deciding whether or not to operate in cases in which secondary malignant growth is suspected and in determining the nature of pelvic tumours. The parts of the abdominal cavity readily seen are the under surface and anterior border of the liver, and, by tilting the patient into the Trendelenburg position, the upper surfaces of the pelvic organs; between these two regions the intestines get in the way. In obscure cases of jaundice it has been possible to diagnose with certainty cirrhosis, syphilis and secondary deposits in the liver. An enlarged gall-bladder may be clearly seen, but the pancreas is not in sight. Tuberculous peritonitis has been correctly diagnosed, and biopsies of the omentum and of the liver have given valuable information. Fibroids and ovarian cysts are readily demonstrated. The differential diagnosis of ascites can be made. Early leaking of blood from an ectopic pregnancy gives an unmistakable picture. The advocates of peritoneoscopy say they have been able to save unnecessary laparotomies and give material aid in arriving at a prognosis in difficult cases. They do not claim that this is an infallible method of diagnosis, and in fact have found it of most aid in confirming a diagnosis already strongly suspected. The question remains whether surgeons in this country will think the risk and inconvenience of an exploratory laparotomy sufficient to make them adopt this alternative.

2. Horan, T. N. and Eddy, C. G. *Surg. Gynec. Obstet.* 1941, **73**, 273.

Annotations

BACTERIA IN DISTILLED WATER

IT is important at any time to have reliable standards when assessing the bacterial content of water, and in war-time, when supplies may be contaminated, such standards need to be especially trustworthy. Bigger and Nelson[1] have cleared up some doubts about the significance of variations in coliform-bacillary counts, and have called attention to fallacies in methods of filtration. Though their experiments were primarily concerned with the technique of water examination, their findings have a direct bearing on everyday medicine. Thus they note that water which is pure in other respects may acquire from rubber tubing, corks or filters traces of powdered talc, asbestos, silica or other earthy matters; and though these may be sterile and protein-free their presence makes it possible for bacteria to grow in the water as soon as it comes into contact with air. These solids do not form the nourishment of the organisms, which live, it seems, on carbon dioxide, traces of ammonia and perhaps other minor gaseous constituents of air. The action of the siliceous particles appears to be catalytic; in their presence distilled water—which normally will not permit contaminating coliform bacilli to multiply—becomes strongly favourable to their growth. This finding throws light on the work of Knott and Leibel,[2] who reviewed the factors inducing pyrogenic properties in fresh and stored distilled waters used to prepare solutions for intravenous injection. Their experience suggested that a reaction in the patient was more likely to be provoked by traces of protein (often bacterial in origin and detectable by a rise in albuminoid ammonia) than by particulate or inorganic matter. Yet they remarked that it was a commonplace of the preparation room that solutions showing inorganic deposits were very liable to prove pyrogenic, and if such reactions were to be avoided deposits of any kind were inadmissible. The work of Bigger and Nelson seems to bring these apparently conflicting experiences into line. In the absence of siliceous matter, bacterial contamination of doubly distilled water is not followed by growth of organisms; but if sufficient particles of silicate are present multiplication begins even at room temperature. Both factors are thus necessary, but neither the initial contamination nor the number of particles present need be large for organisms to grow. Thus small lapses from technical perfection may produce serious and far-reaching pyrogenic results. No special silicate and no particular contaminating organism can be held responsible; Bigger and Nelson produced the same results with various silicates and with most of the common coliform organisms and their variants. It is thus unnecessary to postulate a special strain of "distilled water bacillus," as once was the fashion, or to blame a particular bit of the customary apparatus. Those charged with the preparation and care of intravenous supplies must beware of traces of catalytic silicate and of the chance coliform contaminant.

1. Bigger, J. W. and Nelson, J. H. *J. Path. Bact.* 1941, **53**, 189.
2. Knott, F. A. and Leibel, B. *Lancet*, 1941, **1**, 409.

CATGUT SUTURES

CATGUT has been employed for the ligature of vessels since the time of Galen; it was not until last century that it came into use as a suture material. Since then it has been almost universally adopted, for its qualities conform closely to those of the ideal suture, but it has to be used with discrimination. Howes[1] points out that catgut is a foreign body and excites a tissue reaction which is sometimes accompanied by infection, particularly when it is used in the skin and mucous membranes. Apparently catgut encourages infection by acting as a culture medium. It is also not well tolerated by muscle and in fat, where the poor blood-supply is probably responsible for a low-grade inflammatory reaction with considerable necrosis and induration. To minimise the risk of infection and the foreign-body tissue reaction, Howes advocates the employment of catgut in fine sizes arguing that in any case the strength of a sutured wound is limited by the power of the tissues to retain the suture. The tensile strength of chromic catgut no. 1 is about ten times that of aponeurotic tissue. To employ such a size is clearly unnecessary, although allowance must be made for the weakening of the thread from absorption, its tensile strength being probably reduced by half four days after insertion. Howes suggests that no size greater than no. 0 is needed in suturing any tissue and that much finer gauges (0000 or even 00000) should be used in tissues which have a poor holding power for catgut. If additional strength seems necessary he advises a larger number of interrupted sutures, although he points out that there is no advantage to be gained by placing them closer together than 1 cm. Bowen[2] says that larger

1. Howes, E. L. *Surg. Gynec. Obstet.* 1941, **73**, 319.
2. Bowen, A. *Amer. J. Surg.* 1940, **47**, 3.

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sizes of catgut are actually digested more rapidly and lose their thread strength earlier than finer ones, because of the greater tissue reaction produced by the larger sizes and the more certain impregnation of the smaller gauges of chromic catgut during manufacture. Howes maintains that the incidence of wound infection is reduced and healing hastened by paying attention to these points. These views are supported by previous experimental work. Bates[3] points out that the edges of a healthy wound do not adhere firmly for the first four days but thereafter the strength of the junction rapidly increases until by the tenth day it approaches normal. The ideal suture must therefore retain its strength during the first ten days of healing. Bates's experimental studies showed that the finer sizes of chromic catgut (000) retained an adequate tensile strength for a fortnight, and that healing was rapid when they were used, whereas larger sizes (3) had little to do after a week, although the wounds were poorly healed even at this stage. Plain catgut of all sizes was even more rapidly absorbed and accompanied by inflammatory reaction and delayed healing. Bower, Burns and Mengle,[4] from experimental work on dogs, reached similar conclusions regarding the healing of intestinal wounds and laparotomy incisions. They have applied their experimental findings clinically with success. Unabsorbable suture materials have been growing in popularity in recent years, particularly in America. Those who advocate their use have emphasised the disadvantages of catgut. Whipple[5] points out that among the factors influencing wound healing the use of fine needles and sutures is important, in order to avoid trauma and foreign-body tissue reaction. He therefore advocates the employment of silk, but it seems that when catgut is used in suitable sizes most of the objections to it disappear.

VAGINAL EXAMINATION DURING LABOUR

So much has been written about the potential dangers of making a vaginal examination during labour that in the ranks of the extremely cautious this procedure has been totally vetoed and replaced by the routine employment of the rectal route for diagnosis and prognosis. A vaginal examination in labour undoubtedly carries with it a small but ever present risk of introducing infection from the perinæum and the lower reaches of the vagina into the cervix and uterus or further; such an infection may be endogenous from the patient herself or exogenous from the examiner's hand or person, especially his nasopharynx. Whatever precautions are taken there still remains a small risk. Such precautions include the intelligent use of an impervious mask to cover mouth and nostrils, the exclusion from the labour ward of all personnel harbouring any form of nasopharyngeal infection, however mild, not forgetting the common cold and the seasonal sore throat, the employment of complete surgical asepsis for the examining hand and the use of a dry sterilised glove, careful toilet of the area of examination, and the generous exhibition of some reliable antiseptic, such as Dettol cream. If all these precautions are faithfully observed we have at least given as few hostages to fortune as we can. But the determining factor is not only the method but still more the number of examinations. One or two vaginal examinations carry but a small risk, but every repetition increases the danger, especially if the repetition involves a number of different people, such as the outside practitioner, the admitting midwife, the pupil midwife or medical student, the resident house-surgeon and perhaps as a final court of appeal the consultant. These multiple vaginal examinations constitute a real danger and should always be discouraged, since universally accepted figures show that the morbidity-rate rises in direct proportion to the number of antepartum examinations, and moreover it is a contra-indication to cæsarean section should this be ultimately advisable.

On the other hand, there is no doubt that vaginal examination is the only certain method of exactly assessing the degree of dilatation of the os in difficult cases—for example, when the presenting part is covered by a thin membrane of undilated cervix and yet full dilatation is diagnosed on rectal examination. It is also the only accurate way of diagnosing the presentation when this is masked by œdema of the presenting part and the rectal findings are equivocal. The enthusiastic supporters of the rectal route claim that as much information can be obtained by this as by vaginal examination, but they admit that practice and experience are essential, and they are mostly prepared to resort to vaginal examination when in difficulty or doubt. The dangers of the rectal approach are that it leads to a sense of false security and therefore too frequent employment by too many different people on any one case. Masks and antiseptics are apt to be neglected and the very method of examining the rectum readily becomes haphazard; thus the inadequately sterilised thumb may be placed on the introitus. Erving and Meister[1] ask whether a finger in the rectum which rubs the surgically dirty posterior vaginal wall into the cervix and over the presenting part is any less risky than a properly and carefully performed vaginal examination. They support the limited use of the vaginal route with some convincing figures. In 1000 cases consecutively delivered in the maternity unit of the Millard Fillmore Hospital, Buffalo, 97·5% of whom were examined vaginally an average of 1·4 times, there were no maternal deaths, and the corrected fœtal mortality was 2·7%; 4·5% of the mothers were febrile according to the League of Nations standard. In extenuation of even this small morbidity-rate, it must be noted that Erving and Meister's cases were largely complicated and 75% were delivered operatively, a fact which in itself accounts for any sepsis. The conclusion to be drawn is that a carefully conducted vaginal examination, done once or twice only, is no more dangerous than a rectal examination, while its diagnostic exactitude renders it greatly preferable.

WHY DO MEN MAKE WAR?

WAR, says Mr. D. W. Harding in "The Impulse to Dominate" (London: Allen and Unwin. Pp. 256. 7s. 6d.) is a social institution, sanctioned alike by the aggressor nations and ourselves. During the quiet periods between wars the ordinary citizen has no desire for war, but he has acquiesced in the principle of domination or submission as the rule in private life and confronted with dominant intentions on the other side (as the citizens on both sides feel sure they are) he can see nothing for it but resistance. Now come in all kinds of exacerbating influences: innate aggressive impulses; propaganda; and rumour—directed or spontaneous—aided by that process of rationalisation which leads even the most intelligent to manufacture reasons for their emotional responses, and by the citizen's dim understanding of international affairs. The author notes the view that psychological theory belittles efforts to exclude war; but he maintains that the human nature we know is institutionalised human nature, not the biological product that an uncritical reading of psycho-analysis would suggest. If the psycho-analytic view is correct it means that the emotions leading to war are "neurotic," for the greater the influence of repressed impulses in determining behaviour the more neurotic it is.

Mr. Harding seems to put his finger on the primary knot in this tangle when he writes: "The early family

3. Bates, R. R. *Ibid*, 1939, **43**, 702.
4. Bower, J. O., Burns, J. C. and Mengle, H. A. *Ibid*, 1940, **47**, 20.
5. Whipple, A. O. *Surg. Gynec. Obstet.* 1939, **69**, *Internat. Abstr. Surg.* 109.

1. Erving, H. W. and Meister, E. F. *Amer. J. Obstet. Gynec.* **1941**, **42**, 326.

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situation must be the means by which society perpetuates its typical patterns, the means by which it forms a closed circuit and precludes criticism of its basic assumptions"; and one of these assumptions is the validity of the institution of war as a means of settling differences between states. No scientific view of war, says he, can undermine our conviction of being morally justified when we fight against wrongful aggression, just as we need not doubt our moral right to defend ourselves or our law-abiding neighbours against robbery with violence even though a detailed analysis may convince us that our established institutions are responsible for producing criminals. In a now forgotten book "The Science of Power" Benjamin Kidd showed how our social institutions depended upon a social heredity, and although stable through the centuries are capable of rapid and radical change which can be consciously directed. Mr. Harding indicates means by which our social heredity could be altered towards integration. An international authority to enforce peace, he points out, is domination on the grand scale. He would have us recognise that dominant behaviour is an institution which our culture has devised and perpetuated just as the neurotic person has created his incapacitating illness. Prophylaxis must depend on psychological security for the individual and elimination of those family and social traditions which preclude criticism of society's basic assumptions. The first requirement could partially be met by sociological changes; the second, he thinks, calls for a widespread application of individual analysis, particularly of child analysis. The proposition thus to alter our social life is alarming, he admits; our impulse is to take a firmer clutch on what we already have, even though what we already have includes war. A similar reaction of insecurity to any invitation to change, even in small matters, stands in the way of all integrative behaviour.

This summary of his views cannot do justice to the balance of the book, or to its careful study of the mental processes involved in the warlike spirit. To follow the author all the way, however, would call for a detachment which few of us can achieve in these times, though perhaps the Chinese could approach it. Their custom of allowing a defeated enemy to save his face is fundamentally sound, rooted in common sense. But to put down Mr. Harding's book and pick up a daily paper is to pass into another world not to be measured by his standards and values. All the more satisfying is it that such a work can be published at this stage. Whether the author's conclusions are right or wrong, the mood in which he handles this, the most pressing problem mankind has ever faced, is the only one reaching towards a solution.

FUNCTION OF THE TRIGONAL MUSCLE

THE trigonal muscle of the human bladder is made up of two parts—Mercier's bar and Bell's muscles. Macleod,[1] in considering their function, correlates their hypertrophy with various pathological findings. The principal functions of the muscle as a whole in relation to micturition appear to be to straighten out and eliminate the urethral angulation; to form a smooth channel leading towards and into the urethra; and to maintain this smooth passage-way, especially towards the end of micturition. The two parts of the muscle, according to Macleod, become hypertrophied under different circumstances—the interureteric bar, when there is extra-vesical obstruction, such as a urethral stricture, and Bell's muscles in the presence of a prostatic projection or a stenosis of the bladder neck. The hypertrophy of Bell's muscles in such conditions is explained by the fact that they have increased work to do to provide a smooth gully along which the urine may run. Macleod's findings are derived from cystoscopic examinations and post-mortem observations. The observation that the interureteric bar is thickened in cases of extra-vesical obstruction has a special interest since it runs counter to the opinion of Frontz and Landes, who hold that the bar is not thickened in cases of urethral stricture. Macleod also throws light on the working of the trigonal muscle. According to him, the interureteric bar prevents encroachment of the bladder mucosa on the smooth surface of the muscle when the bladder is nearly empty.

1. Macleod, D. *Brit. J. Urol.* September, 1941, p. 135.

EXPECTORANTS

AT this time of the year, shrouded in November fog, our island home becomes once again a land flowing with ipecac and ammon. carb. The use of expectorants "to increase and liquefy" the sputum is firmly established by tradition, and the futility of medical treatment—as distinct from skilled nursing—in the management of exacerbations of chronic bronchitis is probably the main reason for the routine prescribing of these drugs; it is not that they have been proved to be of value, but that they are as good a placebo as anything else. The physiological basis for the use of expectorants is perfectly sound: the output of secretion from the bronchial mucosa can be increased by vagal stimulation, and the same effect can be produced reflexly by irritating the vagus endings in the stomach mechanically or by means of drugs. It is well known that nausea and vomiting due to gastric irritation are accompanied by increased bronchial and salivary secretion and not infrequently a cold sweat provides additional evidence that the enhanced activity of the cholinergic fibres has spread far afield in the vegetative nervous system. But no convincing evidence has yet been produced to show that these physiological observations can be usefully applied in therapeutics. The only exception to this is that emetics are occasionally administered to children suffering from acute bronchitis in order to promote transient bronchorrœa with the object of flushing viscid secretion from the respiratory tract. Few indeed are the patients with chronic bronchitis who would submit frequently to the depressing experience of parting with their gastric contents in exchange for the fleeting and sickly pleasures of profuse expectoration. Nevertheless, it was probably the efficacy of this form of treatment in children which led to the unjustifiable assumption that subemetic and even subnauseating doses of drugs of the ipecacuanha series would produce the same effects on the bronchial secretion as emetic doses. It is remarkable that so little attention has been paid to the time of administration of expectorants in relation to meals. Only a small minority of people experience nausea when they take average therapeutic doses of these drugs on an empty stomach, and it therefore seems highly improbable that such doses can excite reflex effects by stimulating the gastric mucosa when the interior of the stomach is protected by foodstuffs and the mucoprotein of the gastric juice. By clinical observations on patients suffering from chronic bronchitis, Alstead [1] has shown that no significant change occurs in the output of sputum when patients receive maximum therapeutic doses of the expectorants in common use. Perry and Boyd,[2] by experiments on rabbits and cats, have confirmed Alstead's findings, in so far as it is possible to apply to man observations made on animals. Using a dose of ammonium chloride corresponding on a body-weight basis to that of Alstead, they could detect no increased output of respiratory-tract fluid. This is particularly interesting in view of the substantial dosage of ammonium chloride which Alstead's patients received—gr. 80 daily. The rest of the paper by Perry and Boyd will make a stronger appeal to the pure experimentalist than to the practising doctor, for the doses of the drugs under investigation were so large that the results cannot be applied to man. Thus an

1. Alstead, S. *Lancet*, 1939, 2, 932; 1941, 1, 308.
2. Perry, W. F. and Boyd, E. M. *J. Pharmacol.* 1941, 73, 65.

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increase in bronchial-tract secretion was reported in rabbits when the animals received a gramme of powdered ipecacuanha per kilo body-weight. On this basis, a man weighing 75 kg. would get a dose of 75 g. (gr. 1125) of the drug, which is 562 times the maximum pharmacopœial dose of powdered ipecacuanha, and equivalent to 2½ pints of the tincture. When it is recalled that a wineglassful of tincture of ipecacuanha administered to the human subject almost invariably results in vomiting accompanied by bronchorrhœa, salivation and sweating, the only conclusion that can be drawn from the experiments reported by Perry and Boyd is that rabbits and cats are extraordinarily tolerant of this and other emetics. No reference is made to the occurrence of vomiting among the cats, but the passiveness of the rabbits is partly accounted for by the inability of these rodents to vomit. There is, of course, the additional factor that all of the animals were under a general anæsthetic during the experiments We are not likely to make much progress in investigating the clinical value of expectorants if research is carried out on laboratory animals instead of patients with respiratory diseases. The physician who is in daily contact with his patients is soon made to realise that he must concern himself only with subnauseating doses of expectorants. Measurement of the output of sputum in wide graduated test-tubes does not entail much trouble and is sufficiently reliable if the intelligent coöperation of the patient can be relied on. Bronchial fistulæ discharging measurable amounts of secretion from the respiratory tract would provide excellent experimental conditions, and the opportunities offered by patients suffering from gunshot wounds of the chest should be seized in order to throw more light on the efficacy of expectorants.

RUBBER DERMATITIS

RUBBER is a popular constituent of footgear because of its hard wearing properties, its cheapness and the protection it offers against damp. Some people, however, may become hypersensitive to rubber, responding with dermatitis of the feet to the use of rubber-soled shoes, or even shoes in which the insole has been impregnated with rubber. This hypersensitivity has long been recognised, since dermatitis is specially prevalent in the rubber trade. P. V. Marcussen, who has carried out an investigation[1] in Denmark, recalls recent work showing that the chemical accelerators used in the hot vulcanisation of rubber may be responsible for such sensitisation; and mentions the finding of P. Bonnevie that in a series of factory cases the accelerator causing the trouble was invariably mercaptobenzothiazol. Marcussen himself tested for rubber sensitivity all cases of dermatitis of the feet attending the skin department of the Copenhagen Finsen Institute over a period of 5 months. The patients were first examined for mycotic or trichophytic infections, after which a patch of warm vulcanised rubber was applied to the right leg. If there was no reaction similar tests were carried out with material from the patient's own shoes and with various chemical accelerators used in the rubber trade. Of 102 patients with dermatitis of the feet, 11 (10%) were hypersensitive to rubber and the history was similar in many of these cases. One boy of 12, for example, had three attacks of dermatitis between 1938 and 1940, all of which were associated with the use of rubber shoes. The first attack had been treated as impetigo bullosa, caused by wearing plimsols and had disappeared in a fortnight; in the second attack he was treated for epidermophyton interdigitale, the trichophytin reaction at that time being strongly positive but the mycotic test negative; this also cleared in a fortnight, but three months later he had a more severe attack in which warm vulcanised rubber gave a strongly positive reaction. The eruption became worse when the dressings included mackintosh sheeting and improved as soon as this was replaced by oiled silk. Another patient, a woman of 51, had had irritation due to a pair of rubber garters twenty years before. She had replaced them with another pair—also rubber—and had had no further trouble until 5 weeks before she was examined, when she had bought a pair of cheap shoes, apparently made of leather, which caused much irritation of the feet. She had worn slippers for a time and the irritation had cleared up, but after she had spent a few hours in rubber boots, on washing day, a rash broke out; this failed to improve on treatment which included a rubber bandage, and she gave a strong reaction to hot vulcanised rubber. The soles of her new shoes turned out to be made of a mixture of leather and rubber—a favourite combination, it seems, among makers of cheap shoes. She subsequently had attacks when she wore shoes with rubber-impregnated insoles, goloshes over low-cut shoes, or shoes with an elastic gusset in the strap; she gave negative results to trychophyton and mycosis tests throughout. A third highly sensitive case developed an attack after standing for a few moments on a rubber mat after a bath. The cases appear to be commoner in summer, either because rubber footgear is then in more general use or because the traces of accelerator substance present in the rubber are released more freely at higher temperatures. Age and sex seem to make no difference to incidence; there is no evidence of family predisposition and as a rule no history of previous intolerance to rubber. In 8 of the 11 cases the attack appeared within 1–7 days of contact with the rubber; in only one patient was the interval as much as 3 weeks. Previous attacks, numerous in some cases, had occurred in 5 and had lasted 3–6 weeks. The toes were affected in all cases and in 5 there was also spread to the dorsal, and in 5 to the plantar, surface of the foot; the heel was affected in one case. An eruption also appeared on the hands in 6 cases, and one had generalised dermatitis. Thus the site of the lesions does not help in the differential diagnosis between rubber dermatitis, mycosis and epidermophytosis. In 7 of the 11 cases epidermophytosis had actually been diagnosed in previous attacks; the series does not indicate whether a preceding attack of epidermophytosis has any significance in the ætiology of rubber dermatitis, but the fact that mycotic tests were always and trichophyton tests mostly negative suggests that any connexion of the kind is unlikely. The incidence of rubber dermatitis is rare in comparison with the prevalence of rubber-soled footgear. But the patients affected, though few, are at a serious disadvantage, Marcussen thinks, partly because the diagnosis may be missed and the shoes causing the trouble may not be discarded, or the condition may be aggravated by the use of dressings containing rubber; and partly because prophylaxis is difficult in that women's shoes often have insoles containing rubber or held in position by rubber solution, and this may be overlooked or give rise to fresh attacks.

1. *Nordisk Med.* Sept. 6, 1941, p. 2507.

Mr. F. C. BARTLETT, F.R.S., professor of experimental psychology in the University of Cambridge, has been appointed a member of the Medical Research Council in succession to the late Prof. A. J. Clark.

The latest list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £35,000. Up to last September the distribution committee, of which Sir Hugh Lett is chairman, had paid out over £8000 (not £5000 as stated in THE LANCET of Nov. 22).

On Wednesday, Dec. 3, at 3 P.M., Sir David Munro, chief medical officer of the Ministry of Supply, will open a new medical department at the Longbridge works of the Austin Motor Company.

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Special Articles

GENERAL MEDICAL COUNCIL

PRESIDENTIAL ADDRESS

OPENING on Tuesday the 154th session of the council Mr. H. L. EASON began with a word of regret that they could not sit in their own home as he had hoped in May. Once again therefore the council was availing itself of the generous hospitality of the Royal Institute of British Architects. He recalled the death since last session of Dr. Robert Briggs Wild, who represented Manchester University on the council 1922–27. The pharmacopœia committee had greatly benefited by his special knowledge and experience in pharmacology and therapeutics. Birmingham University had chosen its medical dean, Prof. L. G. Parsons, to fill the place vacated by Mr. Gamgee after fifteen years of varied service on the examination, executive and curriculum committees which had all profited by his terse and pointed observations. He also welcomed Dr. Thomas Fraser, lately president of the British Medical Association, elected in May to fill the place of Sir Norman Walker as direct representative for Scotland; and Prof. W. J. Wilson, medical dean of Queen's University, Belfast, as successor to Professor Lowry, now sitting on the council as a Crown nominee.

DEFENCE REGULATION 32B

Mr. Eason pointed out how this regulation debarred a doctor from temporary registration unless he could show that he was by law entitled to practise in some territory (or part of it) outside the United Kingdom to which the regulation had been applied. The Order in Council laid down that an applicant must show to the satisfaction of the council "that he holds a medical diploma or diplomas," and after consultation with representatives of the Home Office, Department of Health for Scotland, and British Medical Association, the regulation was amended, in September by adding after "holds" the words "or is duly qualified to obtain."

Effective applications for temporary registration could therefore now be made by persons who are by law entitled to practise in any place outside the British Islands, or, though not so entitled, hold (or have held) a medical diploma granted in any such place, or have passed examinations qualifying for it.

The new order, Mr. Eason remarked, also extends facilities for entry into civil practice by deletion of the words "not involving medical attendance on patients in their own homes." Applicants may now enter employment as assistants to practitioners whose names appear (other than temporarily) in any of the three sections of the Medical Register. These amendments, he said, will greatly relieve the responsibility in deciding difficult and doubtful cases, at the same time greatly increasing the responsibility for securing a guarantee that every applicant has the requisite knowledge and skill for the efficient practice of medicine, surgery and midwifery. Happily in these matters he had been able to rely upon the experience and information of the Conjoint Examining Board.

THE MEDICAL STUDENT'S SCIENTIFIC GROUNDING

The council will have noticed, said the President, the revival of interest both in the medical and in the lay press in the preliminary and early scientific education of the intending medical practitioner. No doubt the education committee would take these comments, criticisms, and suggestions into careful consideration, though the problems raised were carefully considered by the curriculum committee and the council before the 1936 resolutions on professional education which came into operation in November, 1938. Every medical student should, he said, have a thorough general education as well as the grounding in the basic sciences without which he cannot expect to profit by his later professional studies. The difficulty is that a complete general education would make a medical training so long as to be almost impracticable for the average student to spend the time or afford the cost. Some compromise between extreme views was therefore essential, although it might fail to satisfy those whose interest was concentrated upon a particular part of the curriculum.

FLOWERING OF A HEALTH SERVICE

HEALTH AND MEDICINE IN THE U.S.S.R.

Virchow, in the last century, said "Medicine is a social system." With this as his text Dr. A. W. Lipmann-Kessel, speaking at Aylesbury on Nov. 20, told of the origin, between 1917 and 1922, of the present health organisation of Russia. It began, he said, in a country devastated by war, revolution and counter-revolution; and the enemy at that time was the louse. Typhus was spreading so rapidly that by 1919 Lenin knew that either socialism must defeat the louse or the louse would defeat socialism. Dr. Semashko had been appointed as the first people's commissar of public health, and an account of the problems he had to face in those early years appeared in our columns in 1920.[1] The slogan chosen to launch the new health programme was this: "The health of the people is the task of the people themselves."

As early as 1918 the programme of the U.S.S.R. included a comprehensive series of health and sanitary measures. Mayakovsky and a group of young fellow poets left their verses to chalk health slogans on walls all over Russia. They set the pace during that early period of the health revolution, and their inspiration has carried over into these days. Dr. Lipmann-Kessel told how he had visited a mother and child welfare clinic in Moscow in recent years. Young medical women were taking the mothers round and explaining the anatomy and physiology of maternity to them with the aid of fine charts and models. In the midst of them was a group of Red Army soldiers receiving a lecture from a woman doctor on the same topic; paternal responsibility in Russia includes education in the hygiene of maternity. Respect for health is taught early. In the schools the children covet the post of health inspector. Two children in each class are appointed to this position and they not only make sure that the windows are open, and that each child brings a clean handkerchief to school, but have charge of a health register which they keep up to date. If any child stays away the children health inspectors visit his home, find out why, and carry a report back to the health officer at the school. There are also health conferences for children, and they are taught public health as part of their curriculum.

Every kind of medical treatment is given free of cost to every citizen who needs it. The basis of the service is not, as with us, the general practitioner working alone, but the health centre, staffed by a group of doctors, specialists and nurses and equipped with facilities for diagnosis. Health centres are placed in the factories, the suburbs, the collective farms or anywhere else where they are needed. In Moscow, at the Stalin motor works, which employs 35,000 workers, there is a network of first-aid posts, as well as six visiting centres which those with minor injuries and disabilities can attend for treatment. For those with more serious troubles there is the central polyclinic, staffed with 124 whole-time doctors and 18 dentists, who are responsible for the health of the workers. This accent on health is no polite fiction; in Russia promotion of doctors depends on the standard of health among workers in their charge, and on a falling level in the time lost at work. The graphs plotted to show progress are of health achieved, not of sickness overcome, and the polyclinic is responsible for the prevention, diagnosis and treatment of all disease within its area.

Between 1919 and 1923 the probability of sickness in Russia was high: most of the people were ill or likely to become ill. They were impoverished, famine stricken and disease ridden; and on this foundation of a sick population one of the greatest experiments in health services was built. It is meaningless, Dr. Lipmann-Kessel believes, to compare the number of hospital beds available in England with the number in Russia; per head of population we still have the lead in beds. But a more significant figure, he suggested, was the threefold increase of beds in Russia during the last ten years. In the same period the number of doctors has been nearly doubled. A Russian institution which we should do well to copy at once, he thought, was the night sanatorium. Between full incapacity and full capacity there is often a transition period when a man is not fit to do a whole

1. *Lancet*, 1920, 2, 519.

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day's work or a heavy job but when he would be the better for doing something. In the U.S.S.R. the man returning to work is examined at the factory clinic and allocated to a suitable job, for a suitable number of hours daily. After work he goes to the night sanatorium where he is under the care of doctors and nurses and is given the food he needs. Tests to estimate his response to return to work can be carried out, and his work is graded to meet his recovery.

The casualty service in Moscow is also fully organised. An emergency hospital serves an entire region, taking in every urgent case. The telephone calls reporting cases are taken by a highly skilled member of the medical staff who, on the strength of what he is told, decides whether to send the emergency ambulance, which is express, or one of the ordinary ambulances. If the express ambulance is sent, its moment of departure is recorded by the breaking of a light beam and its return is checked in the same way. Every week the times taken on calls are analysed and any unexplained delay is investigated. The young doctor who goes out with the ambulance is expected to make a quick diagnosis and to record it in a book. His diagnoses are checked against the hospital findings, and the man who perpetually makes wild diagnoses can thus be detected.

Dr. Lipmann-Kessel reminded his hearers of the service Soviet research into the storage of blood had been to us in this war, and recalled Russian work on blood taken from the cadaver. Russians have also perfected a technique of blood-transfusion for use in the front line; and their use of aerial transport for the wounded saved many lives in the Finnish campaign. He described an ambulance tank which can be taken on to the battlefield and manœuvred to cover the wounded man, who is then lifted in through a sliding panel in the floor. Thus the wounded can be retrieved without danger to stretcher-bearers.

Pavlov spoke of Russia as the only country in the world where research could be carried on unfettered by economic ties. This principle is carried into medical education; medical students are chosen only from among the best students; they receive free education and free books, and are paid during training like any other worker in the Soviet.

SCOTLAND

EDUCATION OF CRIPPLES

Dr. G. J. I. Linklater, school medical officer for Edinburgh, speaking at a recent meeting of the Cripples Welfare Association said that the surgeon could now work wonders with the crippled child, but after he had done his best the child was put into the world with other children who had had full facilities for education. The crippled child had been losing each year and education must be provided to bring him up to as high a scholastic standard as possible. Muscles which had been altered by surgery must also be re-educated, and children who were unable to follow ordinary pursuits and exercises must receive psychological education. Unless the inferiority complex were counteracted it would follow the child into life, with the further development of the timid person afraid to compete with his peers, the recessive person who would not establish social contacts, or the unlovable person who tried to overcome his limitations by over-compensation. Dr. Linklater drew attention to an obstacle which arose in relation to occupational therapy, when people who had been trained were not accepted by trade-unions because they had not served an apprenticeship. Although they were competent workmen they had great difficulty in obtaining employment. The visiting teacher was a great stimulus to the children who learned to read, write and make contact with the outside world. They were taught to use their hands, and their attention was taken away from their disability. Unfortunately this had ceased with the war but he hoped it would begin again.

PART-TIME MISSIONARY

Dr. F. M. Graham, who died in Edinburgh on Nov. 17 at the age of 71, was for many years a medical missionary in India. He took the Scottish triple qualification in 1890, his F.R.C.S.E. in 1895, and the M.D. of Durham in 1906. For some time he acted as tutor in clinical surgery and clinical assistant in the medical outpatient department of the Edinburgh Royal Infirmary, and as physician to the Cowgate Dispensary. He was an examiner in anatomy to the Royal College of Surgeons of Edinburgh. At the end of last century he went to India where, working as a free lance, he helped the medical missionaries in the winter and in the hot weather practised in the hill stations. But his health was never robust and he was forced to return to this country. However he followed the same plan of working, practising in Britain during the summer and in the Church Medical Society's hospital in Old Cairo in the winter. During the last war he worked as a civilian doctor in hospitals in France and for his services was created chevalier of the Légion d'Honneur. Dr. Graham's wife died a few years ago.

In England Now

A Running Commentary by Peripatetic Correspondents

STRUCK down by a virulent organism which crept up on me unnoticed, I was dispatched to a certain Civil Defence Sick Bay. Surrounded by comfort and the best attention I made a quick recovery and soon reached the critical stage, by which I mean the stage when the patient begins to criticise his treatment. The only grouse I could raise was that I was aroused at a quarter to seven in the morning. As insomnia was a feature of the illness the point was an acute one. It was only slight consolation to recall that in previous experiences of general and Service hospitals and nursing-homes the hour of wakening had been still earlier. Discussions with the sister produced the familiar arguments that everything had to be cleaned up before the doctor came, and unless an early start was made the work would never be done; moreover, it was the traditional hospital practice. I remained stonily unconvinced. As a physician it matters little to me whether a hospital patient has had his face washed before I call or not. A rearrangement of organisation could ensure that the work could be completed if it was started later. It is unjustifiable to assume (as is often done) that a tradition is ipso facto good. Like many another I customarily go to bed between 12 and 1 and rise about 8. Surely the average patient, and more particularly the sufferer from insomnia, does not derive any special benefit from such a drastic change of habit which puts out the lights at 9 o'clock and rouses him at 5—or even earlier. I have always held the view that patients were more important than physicians in the hospital, although such an opinion may seem heterodox in many quarters. I have even thought (though I would not dare to say so without the blessed cloak of anonymity) that the H.P. was really more important than the honorary. At least, he does the bulk of the work, although of course it is under direction. All this being so there does seem ground for re-examining the position, and as a final point a personal experience might be quoted. In several instances when my patients could not sleep, I have ordered that screens should be put round the bed and that he should not be disturbed in the morning under any circumstances until he awoke. This "eccentricity" of mine was singularly unpopular with the ward sister, but the results for the patient were so satisfactory that I insisted and persisted.

* * *

Those of us who formerly practised and must still live and support our families in the morally devastated areas of London once known as "good residential neighbourhoods" cannot but be grateful to the Ministry of Labour and National Service for employing us usefully on its medical boards and paying us for our work; but we wish sometimes that we could have a little friendly talk with the minister about the way his ministry orders its affairs and ours. Some matters are so curiously ordained. The most curious is the wildly irregular incidence of boards. The vagaries of the weather, the whims of women and the arrhythmia of auricular fibrillation are nothing to it. There was a time last year when for several weeks on end a weekly routine was actually maintained but those days are gone, we suppose for ever, and we now accept, like good children, three days' notice of next week's sessions—which may vary from six or eight to one or none—and are not unduly put about when, say, nine sessions actually allotted us are cancelled at a

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stroke of the pen. So far as we can see all future board-work may cease at the end of any week with no notice at all, yet it often happens that two-thirds of our working time is taken up by it and we must regulate our other activities accordingly. We cannot, of course, make the wildest guess at our income for more than a week ahead and budgeting is out of the question. "C'est la guerre," we say sadly but in our hearts we fear it is only bureaucracy. We wonder whether a member of the Amalgamated Society of Bottle Washers, or of any profession less bred up to meekness and longsuffering than our own, could be used quite like this by an elected government and whether this is a fair sample of the promised golden age of state medical service; but either from citizenship or some less noble motive we keep our complaints to ourselves and come and go as bid. When peace comes no doubt the Ministry will go to the Heralds' College for a coat of arms. Meanwhile how would this do: *Azure, a weathercock revolvant or* with motto, *Varium et mutabile semper?*

Medical boards, 1939–41, as thousands of young men and hundreds of doctors now know, are run on the Ford or moving-belt system. The candidate and his document pass down a row of four cubicles, each containing a doctor who does his bit, records his observations and his opinion of the bit he has done and hands them on. Number four not only does his own bit but reviews the work of those before him, considers the candidate as a unit of manhood, records his notion of a suitable grade, and, with an "over to you, over," sends him across the room to the chairman. The chairman rapidly surveys all the recorded facts and opinions and the candidate himself, reaches a decision and records it. If he finds himself differing substantially from other members of the board he consults with them and endeavours, usually with success, to reach an agreed decision. He and the whole board work according to instructions which are in some matters extremely precise, in others quite indefinite. As to the bits, those who first allotted them seem to have had it in mind that the members of the board would be what are termed "physicians-and-surgeons" and should accordingly be treated each to a scrap of medicine and a scrap of surgery. How otherwise would the astonishing assortment of ears and hearing, urine and belly have fallen to number four? Experience has led to a more logical grouping of functions between the members and finality may not yet have been reached, but it has all along been true that only number four and the chairman have either the duty or the opportunity of considering their man as a whole.

When, therefore, the eager doctor starts out for two consecutive sessions of medical board widely different experiences may lie before him. He may spend the greater part of five hours in the rapid examination of samples of urine for albumin and sugar, relieved by intervals for the terse and vivid description of every variety of hair, complexion, eye, mole and scar. He may keep his joints supple by 30–60 performances of "up in the morning early" exercises vis-a-vis the same number of mildly astonished recruits. He may take histories, test vision and assess mentality against time, or he may make a rapid general medical survey and enjoy the sport of seeing if he can catch his colleagues out. It may occur to him that some of these occupations scarcely require for their efficient performance the discipline of the medical curriculum and the experience of practice, or, of course, he may find them a pleasant relief from more responsible work. On some days the number and quality of the candidates make the work easy for every member of the board; on others it is laborious for all, very laborious for some and quite impossible to get it done in anything like the allotted time. Regarding the matter more broadly it is hard to know whether this Ford method is in the circumstances the best way of doing the job. Three good clinicians, one being chairman, with an unqualified assistant to weigh, measure, test urine and record the police description, and with a proper allowance of time, could almost certainly do it better, especially if they were told how their assessments worked out when the men got into the Services. But they too would have to divide the examination of the man and they might not find it easy to devise an efficient and satisfying plan. The present method does assure for each recruit a reasonably complete examination, approximating to a prescribed standard, capable of rapid performance and as little dependent as may be on the personnel of the board, but those who do the work have almost no means of guessing whether their assessments do in fact conform to the needs of the Services. There is at present no liaison between chairmen or members of boards and commanding officers or medical officers of Service units and it is obvious that there ought to be.

From the point of view of the medical profession it is certainly worth noting that this is the manner in which the state in 1941 finds it natural to tackle a clinical problem. It does it by what it would call a team of doctors, of whom at least three are employed in work which makes minimal demands on clinical skill, judgment or experience—work far below the standard of which any good doctor is capable. The notion that the board is a team is, of course, an illusion. Three doctors round a table may form a team. Four doctors in a row of cubicles working against time with a chairman at a table noting their findings and making a final decision may constitute a good little machine for rapid examination but is not and cannot be a team.

What of the recruits and the clinical aspect of the work? Experience of the samples of the population seen in one corner of outer London over a period of eighteen months is obviously not enough for any large pronouncements, but it does amply justify the assertion that we have a large number of most admirable young men. There are days when almost without exception the candidates fall obviously into the first class, and one comely, upstanding, muscular young man after another passes smoothly down the board, cheerful, alert, manifestly keen to be passed fit and making the least of any defects he may have. These young men follow a great variety of trades, but the best, as might be expected, are those who work with eye and hand out of doors—dockers, lorry drivers, builders of various kinds, skilled artisans and their labourers. Clerks are far less uniform as specimens of good manhood but the best of them are excellent, surpassing sometimes even the manual labourer. No "C3" class of young man has passed under my eye, and I have seen no trace whatever of widespread malnutrition. It would be ludicrous to suggest that these almost perfect physical specimens whose only common blemish is some degree of neglected dental caries were not, or had not as children been, well and sufficiently fed. Among those in sedentary trades some, even under thirty, are fat and flabby and no doubt their diet is at least in part to blame, but the undersized and the thin, the clinically "ill-nourished," are conspicuously rare. Sometimes, however, the mysterious net which dips into the population, enmeshes its draft and pours it out before us, delivers the most astonishing assortment of what can only be called mixed duds, and on a bad day the collective impression can be most depressing. These bad patches seem to have nothing in common except that the men are probably over thirty and have something amiss. Bad sight, running ears, deafness, valvular lesions, chronic bronchitis, duodenal ulcers, malunited fractures, old poliomyelitis, deformities of the feet (congenital or acquired), varicose veins, epilepsy, parkinsonism, anxiety neurosis, mental defect—anything and everything that can unfit them for life and for military service they have and it is not clear why they all come at once. It is like one of those car journeys when at each succeeding cross-roads the lights turn red as you approach. No doubt some combination of occupation-group and age-group is the real answer, yet their occupations recorded on their papers seem varied enough. What is very clear, and somewhat alarming, is the startling difference between the round-twenties and the near-forties on the one hand and the realisation that some poor, outworn old man of thirty-nine is twelve years younger than the examining doctor, who feels, and hopes he looks, still young and vigorous. Life has used some of them very hard. Putting war aside, is the same fate in store for "the many men, so beautiful"—those young fitters, bricklayers and lorry-drivers' mates that we saw yesterday, or is the contrast a witness to one of the small waves of progress on the ebbing tide of our civilisation?

Sociology apart there is good exercise in rapid diagnosis to be had by those members of the board who are free to survey the man as a whole, and daily lessons in the curiosities and unsolved mysteries of medicine and in that

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still neglected science, clinical physiology. What is the real explanation of that quiet mitral stenosis which we cheerfully dismiss as rheumatic, though no faintest history of rheumatism, chorea, scarlet fever or any illness whatever can be dragged from the victim even by leading questions? Why do holes in the ear-drums and mess in the middle ear, let alone solid plugs of wax in the auditory meatus, affect the hearing so little? What is the truth about the plantar arches? Why did anyone ever suggest that there is a normal systolic blood-pressure between 110 and 160 or a normal pulse-rate between 48 and 120, and why, when we are listening to the blood-pressure noises, is there sometimes a point when they cease (which we then call the diastolic pressure) and sometimes none (when we say nothing about it)? How very little cardiac efficiency is affected by valvular defects! And did you know that one leg was so often shorter than the other? Why do albuminuria and sometimes glycosuria come and go in such an extraordinary fashion, and why are quite athletic-looking young men unable to stretch out one foot without falling over? Does the expansion of the chest vary inversely with the excellence of the physique or is it self-consciousness?

In fact if you are lucky in your place on the board, and are not too violently pressed for time, the work has many compensations; but why, oh why, in the absence of Western Front battles or invasions can it not run steady for a fortnight on end?

* * *

I wonder if others have this form of fantasy. It might be termed "The Parliament of the Genes," and with me it sits when I am having a hot bath or early morning tea. It is a huge parliament, about 2000 members on each side, but is dominated by the front benches, the back-benchers being mostly mute. The Government are parsons, lawyers and farmers, while the maternal or opposition party are more commercial—shopkeepers, in trade or industry, a sailor or two. There is also a small and noisy independent party whom I suspect of being mutations. They have strange methods, this assembly; sometimes they talk in blank verse or rhyme, or rock like a Greek chorus; sometimes somebody says a line or two, and then they all sit for many baths and cups of tea and never say a word, just ruminate about it. The subjects they discuss are rather vague and diffuse—for instance, for the last twenty years or so they have been arguing on and off whether it is better for a boy to have natural history hobbies or, as most modern children prefer, mechanical ones, and this often broadens out into Agriculture *v.* Industry. An excerpt from Hansard might run like this.

The P.M. (a clerical figure with a white stock, in a Gregorian chant): Are not the works of the Lord greater than those of Armstrong-Whitworth, white mice than Meccano? Moreover, if wheels do your work, the best that is in you will not be developed by muscle and sinew.

A very old Opposition back-bencher: We heard that old story before, when arboreal man from a cleft in a stick first threw a stone at a tiger, or again in a later debate on the first bow and arrow. Yet, see where they got us!

P.M. (continuing): The man in machines is half drowned by the grime and the greed of his calling; his lights and fertility wilt in the stench of their rapid explosions.

Independent member: Are mice the most scentless of beasts and pigs without their aroma?

The Opposition break into a chorus: This is a mechanistic age and he who would get on must mechanistic be, And on mechanics must his mind be set. That is the quickest way to L.s.d., And to Debrett.

Independent member: The limitations of your L.s.d. are 1 wife, 1 house and 3 square meals per d., Children to taste; The surplus is pure waste.

P.M.: The happiness that comes from natural things is greater far . . .

Leader of the Opposition: Is happiness our goal? Like cows and cabbages, should man too seek content and rest from searching . . . ?

A sailor sitting next to him: Searching the surface of this earth of ours, searching its inner core, its outer skies, with all five senses, banded, making more, to scour the firmament that yonder lies beyond this speck of planetary dust. . . .

Independent member: Come off it, Jack, we've heard that speech before—you gave it at the last Rotarian lunch.

The debate continues—and probably will till I die.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

THE list of contents on the outer cover of Hansard for Nov. 19 begins, as usual, with Questions, then goes on to Mr. Speaker's Golden Wedding: Congratulatory Tributes and ends with King's Speech (Fourth Day): Agriculture. Nevertheless, in rising to congratulate the Speaker the Prime Minister apologised for committing "an irregularity." No speaker of the House as far back as 1653 has ever reached his golden wedding while in office. And before 1653, Mr. Churchill pointed out, occupants of the chair "held their tenure for shorter and more precarious periods." The Prime Minister spoke of the affection of the House for the Speaker and his family, of their belief in his impartiality and of his kindliness and courtesy to members of all parties, and gave notice of a presentation to be made by a delegation of members headed by the Father of the House, Mr. Lloyd George, later in the day. Mr. Pethick-Lawrence spoke for the Labour M.P.s, Sir Percy Harris for the little Liberal group, Mr. Will Thorne as the oldest member in age, and Mr. Maxton as the leader of the smallest minority in the House. The best speech, almost the perfect speech in the old Parliamentary manner, was made by Mr. Maxton, himself a professed rebel. The Speaker's reply was equally gracious and ended as it was bound to do, for it is the sacrosanct formula in opening the day's business: "The Clerk will now proceed to read the Orders of the Day."

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The forms of the House continue but the change in the content of discussion in the House is very great indeed. Some of this takes place outside the House, in public statements by ministers and others, as it always did. Mr. Maisky for Soviet Russia, and Mr. Eden for the British Commonwealth, speak of close coöperation after the war—and a revolution in thought is accomplished which would have been inconceivable as practical politics up to a few months ago. Our coöperation with the United States, involving the surrender of cherished colonial rights in the West Indies, Central America and elsewhere had, even before the Atlantic Charter, opened up an unknown new road into the future. The days when Mr. Chamberlain could refer to Czecho-Slovakia as being "far off" are difficult to understand in days when the road from Burma to China is an objective of urgent consideration to the Government sitting in London.

But while conceptions are bigger than in the past and new horizons have opened, many of the old conceptions of government and preconceptions of the position of this country vis-à-vis others remain. The debate on colonial affairs on Nov. 20 showed this very clearly. It was opened by Mr. Noel Baker in a speech reminiscent of the days of 1919 when, as he said, "we were drafting the Mandates" at the Paris peace conference. Sir Ronald Ross said that the suggestion that the mandatary system was a success "rather shook" him and called it "as good escapist literature as it is possible to find." Mr. Baker's speech was a great deal more than that, as it gave a big-scale survey of some of the main colonial problems, although Dr. Morgan said its optimism rather perturbed him. Dr. Morgan, however, came down to earth and said we should put the Colonial Office in the dock. The indictment was severe and presented by a man who was brought up in the West Indies and knows the country. Failure to make constitutional changes of a democratic kind was important inasmuch as "these voteless, helpless people" (of Barbados) "cannot do anything themselves to change their conditions, because they have not the power to introduce any legislation to change their social or economic conditions." To do anything in the West Indies it was necessary to "throttle the private land monopoly" and get down to subsistence agriculture instead of concentrating on export agriculture.

Mr. George Hall, under-secretary for the Colonies, replying, uttered some platitudes about the need for "a far greater and more constructive interest in the social, economic and spiritual welfare of the colonial peoples," but failed to reply to the criticisms of Mr. Noel Baker,

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Mr. Creech Jones and Dr. Morgan. Apparently, however, all is well as "that very distinguished Colonial servant, Lord Hailey" is presiding over a committee dealing with post-war colonial problems and so, presumably, the matter can be left in his hands. In which case Medicus is inclined to ask why is he not appointed colonial secretary instead of Lord Moyne?

This kind of "waffling" is no good to the House and does not interest the House—often only about 15 members were present during the debate. It is a grave weakness of the procedure that this should be possible, for the acid test of our belief in democracy will be our treatment of the Colonies and India—and that is another story.

FROM THE PRESS GALLERY

Our Colonial Responsibilities

IN the fifth day of the customary debate on the Address which was devoted to colonial affairs, much stress was laid on nutrition for, as Mr. J. A. E. DE ROTHSCHILD pointed out, vitamins and protein are equally necessary to black and white. Yet the malnutrition in parts of our Empire is still our greatest social folly. Mr. NOEL BAKER thought that we had made progress but in too many colonies there was still too much poverty, ignorance and preventable diseases. Exploitation of labour and of national resources were not only a social crime but also a social waste, and the Colonial Development and Welfare Act passed last year was our first effective step to check the waste. He was glad that the Colonial Office was planning for the future but there were urgent tasks lying to hand. The tsetse fly in Africa was one, and he suggested that we should coöperate at once with our Free French and Belgian allies, put up a sum of money from our Colonial Development Fund, and call in the health section of the League of Nations to organise research and make a start on practical work. Dr. H. B. MORGAN, who was brought up in the West Indies, raised a medical storm with his speech on conditions there. As a doctor, he said, he had seen too many people playing with bandages rather than dealing with the general conditions which underlie the sores, and he was pessimistic about any benevolent policy unless the people on the spot were given a chance, with whatever reservations were necessary, to have some say in the control of local affairs. He inveighed against a system which exported produce and imported heavily taxed food, while income-tax remained as low as 3*d*. to 2*s*. 6*d*. in the £. When he visited Barbados in 1939 the people were living in a black cesspool of disease—yaws, hookworm, syphilis, malaria and tuberculosis. The Rockefeller Medical Commission had found instances of hookworm in two or three parishes in Trinidad amounting to 80–90% of the agricultural population. The doctors in the West Indies are blamed for a medical policy with which they have nothing to do; instead of a unified medical service a doctor may not move from one parish to another, while some of the hospitals he had seen were a disgrace. Mr. CREECH JONES deplored the decision of the Colonial Office not to publish the reports of the colonies and said that our knowledge of their economic and social problems was hampered by a lack of vital statistics. He urged the need for an expansion of the social services department of the Colonial Office and said he would like to see a larger number of expert women with understanding and drive brought into it. He too stressed the need for the exhibition of greater vigour in the whole field of preventive medicine.

Mr. G. H. HALL, parliamentary secretary for the colonies, said that at the beginning of the war we were approaching a critical period in colonial history, and while the war had in one sense delayed the crisis, in another sense it had hastened it. The public conscience had been awakened to the need to take a more constructive interest in the social, economic and spiritual welfare of the colonial peoples who were now solidly behind us in our war effort. Our duty was to improve their lot, to develop their resources so as to raise their standard of life, and to enable them to take an ever-increasing responsibility in ordering their own affairs.

Agricultural Returns

On Nov. 19 Mr. R. S. HUDSON, the minister of agriculture, said that the output of cereals and straw this year will be at least as much again as in peace-time. The total area of crops resulting from the ploughing-up policy is about 45% above peace-time level. The yield from the ploughed-up land has been extremely satisfactory, and the latest estimates of the production of root crops promise a good harvest, well above the average for the last ten years. The production of potatoes will be just short of double the peace-time amount. Farmers have almost maintained our pre-war milk-supply. In 1938 they produced 1076 million gallons; this year we have 1053 million gallons. But liquid milk consumed has gone up by 200 million gallons.

QUESTION TIME

Health of the Nation

Dr. RUSSELL THOMAS asked the Minister of Health if he would examine the standard of nourishment, housing, physical training and working conditions of the nation, with a view to satisfying himself as to whether they were sufficient to promote adequate natural resistance to major and minor diseases.—Mr. E. BROWN replied: I do not think that general inquiries of this kind would usefully add to the continuous work of the Ministry. The health of the nation and the resistance of the people to disease has up to now been good—even I can say unexpectedly good in view of the added risks brought about by war-time conditions. I have no doubt this is largely due to the improvements in social conditions since the first World War and our efforts to maintain and add to them will be sustained.

Increase of Tuberculosis among Women

The latest available figures comparable with prewar years are those for 1940, when mortality among women from all forms of tuberculosis showed an increase of 11% over 1939. The highest incidence was in the age-group 20–24, where the increase was 18%. (Mr. BROWN replying to Mr. JAMES GRIFFITHS.)

Sale of Tuberculous Cows

Mr. C. T. CULVERWELL asked the Minister of Agriculture whether cattle tuberculin-tested by veterinary surgeons authorised by his ministry and found to be tuberculous were permitted to be sold as dairy cattle.—Mr. R. S. HUDSON replied: Yes. The sale of cows reacting to the tuberculin test is not, on that account, restricted, since reaction to the test does not in itself imply infection in the milk of a reactor.

Provision of School Meals

In answer to a question, Mr. R. A. BUTLER, president of the Board of Education, said that 24 local education authorities in Wales provide school meals and 3·9% of the children attending public elementary schools in those areas receive meals at school. There remain six areas—Radnorshire, Llanelly, Neath, Pembroke borough, Port Talbot and Pontypridd—in which no meals are yet being provided, but in all of them provision will shortly be ready or is under active discussion.

In answer to a further question, Mr. J. C. EDE, parliamentary secretary to the board, replied: On a single day in October midday dinners were provided for 21,729 children in the area of the West Riding of York authority. This figure is an increase of 59·9% over the number provided on a day in February last.

Wheatmeal Bread

Captain J. D. PROFUMO asked the parliamentary secretary to the Ministry of Food to what extent the original recommendations with regard to national wheatmeal bread, made by the Medical Research Council, were accepted; and on what grounds any of them were turned down.—Major G. LLOYD GEORGE replied: No recommendation made by the council with regard to national wheatmeal bread has been rejected. All have been acted upon with one exception. That is still being examined.

Captain PROFUMO: Is it not a fact that a standard as to the contents of the national wheatmeal loaf has never been laid down by the ministry—in regard to the amount of bran, &c.—and are not the public being misled into thinking they are eating something of great value?

Major LLOYD GEORGE: I am advised that a specification for the wheatmeal loaf has been laid down.

Captain PROFUMO: I believe the minister will find that that is not the case.

Infection in Labour Camps

Sir PERCY HURD asked the Minister of Health what action he had taken upon the report sent to him last month by the

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Wiltshire public-health committee that the committee had been called upon to provide facilities for cases of vermin, scabies, venereal disease and advanced pulmonary tuberculosis among the imported labourers, especially from Ireland, for employment on Government contracts; and whether steps would be taken to ensure a strict medical examination before importation.—Mr. BROWN replied: Local consultations have taken place with all concerned regarding medical arrangements at the labour camps referred to. The county council's medical officer is giving valuable assistance and the necessary measures are in train. The point raised in the last part of the question is being considered in conjunction with the Ministry of Labour and National Service.

Sale of Horseflesh

In reply to a question, Major LLOYD GEORGE said that shops selling horseflesh for human consumption require to be licensed. Those selling horseflesh for consumption by animals do not at present require to be licensed but will be so required under the Meat Foodstuffs Order 1941 from a date to be announced.

Answering a question to the Minister of Health, Miss F. HORSBRUGH said that under the Food and Drugs Act 1938 the business of slaughtering animals, including horses, for human consumption, requires a licence granted by the local authority. Further, it is an offence not only to sell, but to have in possession for sale, or to consign to any person for that purpose, any food, including horseflesh, intended for but unfit for human consumption. Officers of local authorities have full powers to inspect such food and if necessary seize it with a view to condemnation.

Milk for the Elderly

Sir FRANK SANDERSON asked the parliamentary secretary to the Ministry of Food whether he was aware of the hardship which was being experienced by elderly people, say over 75 years of age, in not being able to secure adequate milk-supplies; and would he consider granting them an extra ration on a basis equivalent to the increase to be granted to young children.—Major LLOYD GEORGE replied: The comparative needs of different groups of people for liquid milk have been most carefully considered in conjunction with the food rationing (special diets) advisory committee of the Medical Research Council. In view of the supply position it has been possible to grant priority of supply only to those whose needs are greatest, and the ministry's expert advisers do not put elderly people within this category.

American Doctors

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health to what services the medical practitioners, who were coming from the United States of America to take up work in this country, were being allotted: to what body their original selection and ultimate distribution was entrusted; what remuneration was offered to them; and what remission of the rate of income-tax imposed on British subjects was accorded to these American practitioners on the salaries paid to them in this country in respect of such service.—Mr. BROWN replied: The doctors referred to are being allotted either to the E.M.S. or to the R.A.M.C. according to their own choice. The selection of the doctors, so far as their professional qualifications are concerned, is carried out in America through the National Research Council, the American Medical Association and other professional bodies. Medical examinations and interviews are arranged in America on behalf of H.M. Government. Doctors who choose the E.M.S. are posted to hospitals by the director-general. The remuneration offered to them is the salary of medical officer in the E.M.S.—£550 a year plus board and lodging, or £100 a year in lieu thereof. I understand that this remuneration is subject to British income-tax in the ordinary way, but the amount of the tax is repaid to the doctors by my department, subject to the deduction of a sum equivalent to American income-tax at current rates. The distribution and remuneration of those doctors who elect to serve in the R.A.M.C. are matters for the Secretary of State for War.

National Medical Register

Mr. T. E. GROVES asked the Minister what efforts, apart from an announcement in the *British Medical Journal*, the Central Medical War Committee had made to maintain the national register of the medical profession up to date; and why had not other medical organisations and journals been approached to assist.—Mr. BROWN replied: I am informed that the Committee obtains information for the maintenance of the register from the local medical war committees, hospitals and various other sources, and that it avails itself of the assistance of such other medical organisations and channels of communication as seem most likely to be effective.

Home Guard Medical Officers

Mr. GROVES asked the Secretary of State for War whether he would raise the age of enlistment for Home Guard medical officers, since over-age doctors who were still in practice must necessarily be employed but could not benefit from classes of instruction, &c., unless they were actually enrolled in the Home Guard.—Captain H. D. R. MARGESSON replied: Cases of this kind are considered on their merits. In general the upper age-limit is not strictly enforced for practitioners wishing to enrol as medical officers in the Home Guard, provided that they are fit.

Mr. GROVES: Was it the considered policy of his department that zone medical advisers of the Home Guard should be appointed from among the whole-time servants of local authorities; and, if so, would he give an assurance that such officers had sufficient time for the duties which would be imposed upon them?—Captain MARGESSON: To avoid undue interference with the medical organisation of the locality, no medical practitioner may be enrolled in the Home Guard unless previous permission has been given by the local medical war committee, which is aware of the professional commitments of practitioners in its areas. This should ensure that Home Guard appointments are not inconsistent with the fulfilment of a practitioner's existing obligations.

Medical Board Delays

Sir IRVING ALBERY asked the minister if he was aware of the long delay which occurred in obtaining a medical board, and subsequent discharge, by men on home stations who were believed to be incapacitated for further service.—Captain MARGESSON replied: Steps have recently been taken to simplify and accelerate the procedure for bringing soldiers before a medical board and carrying out their discharge in order to prevent delays of this kind. Revised instructions were issued on Nov. 1.

Sir IRVING ALBERY: Will the minister consider whether it would not be better to send these men to the depots?—Captain MARGESSON: That is the effect of the new instruction.

Hospital Accommodation at Slough

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health whether he was aware that there was no general hospital nearer to Slough than Windsor, where the accommodation was overtaxed; and whether, in view of the special circumstances, he would authorise the reception of civilian cases by the E.M.S. hospitals in Slough, where there was unused accommodation which the medical profession in Slough urgently needed. Mr. BROWN replied: I am aware that there has been considerable pressure on the beds at the general hospital at Windsor, and I arranged facilities some time ago for reducing the waiting-list by transfer of cases to emergency hospitals within reach of the area. It rests with the hospital to take full advantage of those arrangements The emergency hospital at Slough is in the county council's institution. While it is essential to keep a certain number of beds available there for air-raid casualties and other emergency cases, it has always been made clear that the council can and should admit in the normal way cases needing urgent hospital treatment who cannot get it elsewhere.

Spectacles for the Troops

Answering a question, Captain MARGESSON said that every soldier who requires spectacles is supplied with two pairs so that it should rarely happen that he is not in possession of at least one serviceable pair. There is now no delay in the initial supply of spectacles to soldiers, and adequate arrangements have also been made for the replacement of damaged or lost spectacles in any theatre of war where British troops are serving.

Medical Referee for Notts

Mr. BERNARD TAYLOR asked the Home Secretary on whose advice Dr. F. S. Airey, of Leicester, was appointed medical referee for Nottinghamshire; and was he aware that there was a decided objection by the Nottinghamshire miners attending Leicester.—Mr. HERBERT MORRISON replied: Following a decision to appoint a specialist medical referee for cases of dermatitis arising in this area, efforts were made in

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consultation with the county-court judge, to obtain the services of a suitable dermatologist in Nottingham, but without success. The vacancy was then advertised. Dr. Airey was the only applicant, and on the recommendation of my medical advisers he was appointed. I appreciate that a medical referee at Nottingham would be more convenient for the Nottinghamshire miners, but there does not appear to be a suitable dermatologist there who would be willing to accept the appointment at the present time.

Fifth Valuation of Approved Societies

In reply to a question, Mr. BROWN stated that a short report by the Government Actuary, incorporating such statistics of the results of the fifth valuation of approved societies as it is practicable to furnish in present circumstances, will be available early next year.

Public Health

Damaged Food

IT was only comparatively late in the last war that attention was directed to the urgent need for adequate steps to prevent food spoilage and to conserve what was utilisable. At that time it was possible to visit many ports and find large stacks of tinned sweetened milk set aside as unsound, and often they were all of one brand. The history of that brand is interesting. It came from the United States and in their endeavour to supply the English market some plants were put into operation and run, not by experienced packers, but by people comparatively new to the trade. In this case the promoters were unfortunate, for the site selected for the new factory was a disused brewery. Since the commonest agent causing sweetened condensed milk to become "blown" is yeast fermentation, and since a brewery normally swarms with yeasts, it was not unnatural that a large proportion of each consignment became unsound. But it had its serious side—it was bad economy to use limited shipping space for food which was condemned as soon as it reached this country. It is important that we should not make similar mistakes in this war, when the problem of shipping space looms even larger. It is disquieting to read in the *Evening Standard* of Nov. 13 that the Southwark authority applied for the destruction of 38 cwt. of cooked pressed meat from Eire on the ground that it was unfit for human food, because it was infected. Mr. Bernard Campion, the magistrate, said this was the third lot of meat from Eire which he had been asked to condemn, while the medical officer of health, Dr. William Stott, mentioned that there were large quantities of this meat being imported. No precise bacteriological information is given as to the nature of the unsoundness, but the whole of this particular consignment is said to have gone putrid 24 hours after being taken out of cold store. Probably there was no evidence of specific contamination with food-poisoning bacilli, but inadequate care resulted in putrefaction. Apart, however, from bacteriological considerations it is obvious, particularly in these days, that practical measures must be applied to preserve our food, whether it is imported or whether it is produced and prepared in this country. The present system of centralised slaughter-houses was devised and operated from the point of view of distribution; the requirements of adequate supervision and inspection were secondary considerations. Those responsible for meat supervision were not consulted as to the suitability of these centralised slaughter-houses or even as to whether they were the best available in the area. In fact a number of them are most unsuitable, although improvements have been made. Being placed in one local area the whole of the burden of meat inspection is thrown on the food inspector (almost always the sanitary inspector) of often quite a small town, without regard either to his experience in meat inspection or the multiplicity of his other duties. No provision has been made for him to be assisted by the other food inspectors in the area served, although voluntary assistance has been given in some cases. Some premises are so unsatisfactory that adequate supervision is particularly difficult. There is evidence from various sources that the number of food-poisoning outbreaks has increased. All this, with revelations such as those at Southwark, suggests that the Government needs to pay more attention both to the control over food and to the application of all practicable measures to prevent food becoming unsound. If food is found unfit for human consumption, there is still the possibility that it could be heat-treated and made available for manufacturing purposes or fed to animals. These problems seem to fall within the purview of two ministries—of Health and of Food—and possibly they sometimes fall between the two. There is plenty of expert advice available if outside help is required. As an example of what can be done the following instance may be mentioned. A very large consignment of tinned herrings in tomato sauce was imported recently into this country and on inspection a small proportion of the tins were found "blown," while a higher percentage showed the slight unsoundness called in the trade "springers." The question of condemnation arose, but instead the local medical officer of health consulted the county M.O.H., who with the aid of the county laboratory was able to establish the soundness of all except the definitely blown tins. The advice given and taken was to keep the whole consignment for a month and after rejection of the definitely unfit to pass the rest, unless the holding disclosed a different state of affairs. In this way almost the whole of this large consignment was used without risk.

Tuberculosis in Lancashire

Dr. G. Lissant Cox offers a précis of the work of his department for 1940, but all the records are available for reference. In a county population estimated at 1,900,870 there were on the dispensary registers 7533 patients suffering from tuberculosis (4324 pulmonary, 3209 non-pulmonary), and of these 19·9% were children under 15. During the year 1394 new cases of pulmonary tuberculosis were reported, an increase of 105 over 1939, and 751 new cases of non-pulmonary tuberculosis, 39 less than in 1931. Among young women aged 15–35 there were 386 new notifications of pulmonary tuberculosis (336 in 1938 and 377 in 1939). 1064 persons died from tuberculosis during 1940, giving a rate of 0·55 per 1000 of the population, and this was an increase of 0·01% on the 5-year average.

The county has been able to maintain all its beds, the monthly average in occupation being 942. An increasing amount of thoracic surgery is being done and of the 4324 pulmonary patients 978 received some form of surgical treatment. During 1940 the tuberculosis officers have examined and X rayed 656 recruits referred to them by the civilian medical boards and the council have agreed that recruits for the women's auxiliary services may have the same facilities.

Infectious Disease in England and Wales

WEEK ENDED NOV. 15

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1352; whooping-cough, 2066; diphtheria, 1043; paratyphoid, 30; typhoid, 9; measles (excluding rubella), 671; pneumonia (primary or influenzal), 997; puerperal pyrexia, 136; cerebrospinal fever, 104; poliomyelitis, 21; polio-encephalitis, 1; encephalitis lethargica, 5; dysentery, 204; ophthalmia neonatorum, 78. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 12 was 1307, including scarlet fever, 181; diphtheria, 250; measles, 38; whooping-cough, 475; enteritis, 43; chicken-pox, 40; erysipelas, 24; mumps, 5; poliomyelitis, 8; dysentery, 25; cerebrospinal fever, 10; puerperal sepsis, 11; enteric fevers, 34; other diseases (non-infectious), 87; not yet diagnosed 76.

Deaths.—In 126 great towns there were no deaths from enteric fevers or scarlet fever, 2 (0) from measles, 8 (2) from whooping-cough, 43 (1) from diphtheria, 37 (3) from diarrhœa and enteritis under 2 years, and 38 (4) from influenza. The figures in parentheses are those for London itself.

There were 12 deaths from diphtheria at Liverpool, 4 at Birmingham, and 3 at Sheffield. Manchester reported 5 deaths from influenza.

The number of stillbirths notified during the week was 195 (corresponding to a rate of 38 per thousand total births), including 22 in London.

The M.B.E. has been awarded to Lieutenant G. D. Eccles, M.B., Home Guard (Dawlish), for "conspicuous gallantry in carrying out hazardous work in a very brave manner."

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Letters to the Editor

HYPERTENSION

SIR,—The article by Dr. Richardson and Dr. Smart in your issue of Nov. 15 is of great interest in that it records two further examples of fall in blood-pressure following the removal of a diseased kidney. It would however be wrong not to challenge the assertion in their penultimate paragraph that "all cases of chronic hypertension should have a complete urological investigation." In accord with contemporary practice we may perhaps promote Hypertension to the rank of Captain of the Men of Death. It is an extremely grave, common and intractable disease and any clue as to a means of treatment requires careful examination. The recent work of experimental pathologists, beginning with Goldblatt and his collaborators and reaching a culmination in the recent work of Byrom and Wilson, at last throws some light on a situation of tragic obscurity. But if this work demonstrates that hypertension can be produced by reducing the renal circulation through one or both kidneys it in no way suggests that it is usually produced by a unilateral lesion. We know full well that in the vast majority of cases any demonstrable disease is bilateral and that in an even greater number nothing at all can be shown to be wrong with the kidneys during life.

I would submit that a complete urological investigation of such cases would be a waste of time and money for a horde of unfortunate patients calling for very different treatment. In point of fact each of the cases described in the article had localising signs from the very outset.

Middlesex Hospital, W.1. T. IZOD BENNETT.

COMPRESSED LIMB: RENAL FAILURE

SIR,—In conformity with modern thought—which shows little sign of regressing, of considering any other view—the renal failure following limb compression in bombed dwellings has been imputed to a "toxin" derived from the damaged part. A better, a more reasonable, a more helpful view is that the renal failure begins, advances and ends as the result of an "active congestion of the kidney" (Maitland, A. I. *Brit. med. J.* 1941, **1**, 570; *Lancet*, 1941, **2**, 446)—the cause of which, however, is arterial in origin. Induced by reflexes elicited during the burial period—the Lovén reflex, the skin response to cold, and reflexes arising from pain and fear—it is advanced by the transfusion given to combat shock. Indeed, so marked is the effect of tranfusion on the kidney in these cases that it almost seems that the "nephrotoxin" must exist in the blood or plasma administered to the patient. But on the one hand cases of shock, unassociated with limb compression, treated by transfusion, do not develop renal failure (Bywaters, E. G. L. and Beall, D. *Brit. med. J.* 1941, **1**, 432); on the other hand a case of limb compression treated by infusion to induce diuresis, shock being absent, resulted in anuria (Mayon-White, R. and Solandt, O. M. *Brit. med. J.* 1941, **1**, 434). It is thus clear how the transfused blood acts; it acts mechanically, increasing the mass of the circulating blood. The signs of shock disappear; but the arterial congestion of the kidney, diminished by the state of shock, is reinforced, the patient dying of renal failure.

How explain the shock? Recently I wrote that "the idea that shock is due to a toxin is a myth." Consider the evidence pointing the other way—it is colossal. But if shock, in these or in any other cases, is due to a "toxin," we must suppose that the blood transfused, since it cures the patient of shock, must contain an antitoxin to shock—which is absurd. The blood transfused, as we have seen, acts purely mechanically; it is thus not surprising to find that mechanical measures, other than that of increasing the blood mass, can combat shock—e.g., placing the patient in the Trendelenburg position. A patient of mine, of a different sort, with a falling blood-pressure was placed in the Trendelenburg position, by raising on chairs the legs at the bottom of the bed. In spite of that, the patient got worse; the systolic pressure in the brachial artery fell below 40 mm. Hg—the reading was confirmed by the resident medical officer who said "we must do something." We did do something: we raised the foot-end of the bed on lockers, which with a small rectal sa line resulted in complete recovery.

Shock in these bombing cases is predisposed to by the dehydration, and precipitated by the œdema; watery parts of the blood exude into the compressed and damaged limb, increasing its volume but by so much diminishing the volume of the circulating blood. After admission, the placing of the patient in a warm bed and the application of heat, by attracting blood to the skin, facilitate the appearance of shock. Shock, which must diminish an arterial congestion of the kidneys, as a rule does not last long enough to relieve the renal block which the arterial congestion has caused; with a praiseworthy zeal it has been met with immediate transfusion—to the undoing of the patient. In the same way fluids have been pressed when they should have been restricted. Something seems wrong. It is, I think, that laboratory experiments, thought to mimic nature, are often a gross caricature; and that the life of man is regarded as a series of biochemical reactions rather than as a sequence of biophysical events.

Rugby. R. H. PARAMORE.

BLAST INJURY OF THE LUNGS

SIR,—Dr. Osborn states that no real pathological or clinical distinction has been shown to exist between cases of pulmonary concussion from (*a*) mechanical causes such as road accidents, (*b*) bomb explosions, and (*c*) depth charges. This last is outside our experience. Clinically, our cases did not resemble cases of mechanical injury. There was not the slightest risk of overlooking the lung damage, which Dr. Osborn says may easily happen in cases of mechanical injury. Even the milder cases showed symptoms and physical signs which no-one with any experience of chest conditions could miss. In almost all Dr. Osborn's cases blast and mechanical injury appear to have been associated, whereas it is our contention that the effects of blast and mechanical injury should be studied separately at present until it can be shown that they are identical.

The translation of Dr. Osborn's term "predisposition" into the phrase that blast lesions are "best marked in the phrenico-costal sinus," may not have been a happy one, and we regret it if we have misinterpreted him. In our experience a phrenico-costal sinus pneumonia, separate from one involving the bulk of the lower lobe, developed only once (case 3, fig. II). In addition this man had lesions diffused through the whole of both lung fields. This patient had had severe abdominal blast. Only one other case with severe abdominal blast developed pneumonia (case 7), and this involved the whole lower lobe. Five other cases without abdominal symptoms developed pneumonia involving the whole lower lobe. In four severe cases, and in all the milder ones, there was no evidence of phrenico-costal pneumonia and no grounds were found for directing special attention to it.

J. N. O'REILLY.
London Chest Hospital, E.2. S. ROODHOUSE GLOYNE.

A STATE MEDICAL SERVICE

SIR,—Those who put forward schemes for the improvement of medical practice are performing useful work but must be prepared for criticism. Quite apart from the vested interests of medicine, from which quarter Dr. Thompson appears to expect opposition, it seems likely that many of his colleagues in the public-health service are hoping that he will reconsider the ideas he has put forward in your issue of Nov. 15 (p. 613). Although the framework of the scheme does not greatly differ from others which have already been put forward, it proposes to deal a death blow to the present preventive health services of the local authorities. Dr. Thompson's Utopia is to emerge from a national service of insurance practitioners who will take over the work of the maternity and child-welfare and school medical services which in his own words "would disappear." From the chief medical officer of a welfare authority this is indeed a surprising suggestion and it is difficult to believe that its implications have been realised.

Since the maternity and child-welfare movement began enormous strides have been made in the care of mothers and young children. The work done by the welfare councils in the past has been followed by a dramatic fall in the infant death-rate and later in the maternal mortality figures. But the supervision of infant feeding and child care generally demands a knowledge of pædia-

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trics while the prenatal clinic is of little use if the doctor is not a competent obstetrician. These are specialist jobs, and while I fully appreciate the excellent work of N.H.I. practitioners it must be questioned whether they would be willing to take over the educative and preventive work in these subjects in addition to their clinical duties. In any case they would not have the time, and the urgent calls of the sick would have to take precedence over the routine examination of the presumably healthy.

No form of state service would be possible without the inclusion of the general practitioner, and it is for us all to ensure that the status and working conditions proposed will be suitable and calculated to maintain the high traditions of the profession. But in any national scheme it is hardly conceivable that the educational side of preventive medicine—the maternity and child-welfare and school medical services—should not form the basis of all medical work. The framework of these services now in existence is perfectly satisfactory; their efficiency depends on their degree of development and on the quality of the personnel. Some areas are still behind others but that is no reason why their services should not be improved. Surely the foxes with no tails might try to grow them instead of advising others to cut theirs off.

Welbeck Street, W.1. VIOLET RUSSELL.

LIGATION OF PATENT DUCTUS ARTERIOSUS

SIR,—I have read with interest Mr. Mulvany and Sir Maurice Cassidy's comments on our article. It remains clear, however, that (1) in the two cases reported by us the ductus arteriosus was patent and infected, (2) neither before, during or after operation was there any evidence of the presence of any other congenital cardiac defect, (3) the patients have remained in good health and without symptoms for over a year now, (4) no other treatment of infected endocarditis or arteritis has in my experience yielded two successive cures in two successive cases, and (5) the percentage of spontaneous cure is less than 1%.

I agree with Sir Maurice that it is yet to be seen whether ligation could be justified as a prophylactic measure, for even after ligation a local dimple must persist at the site of the tied ductus, and this might provide a nidus for future infection. But I do not agree that the fact that spontaneous remissions may occur is sufficient to justify us in withholding from a patient a proved therapeutic measure which may have risk attached to it. The risk of the measure must be balanced against the risk of non-intervention, and the chances of remission in infected congenital cardiac defect are very minute.

Queen Anne Street, W.1. GEOFFREY BOURNE.

WHEN TO TIE THE CORD

SIR,—Is there not a tendency to stray from essentials in the consideration of this matter? As far as I am aware, Nature made no provision for adventitious aid in arresting the circulation through the cord. This phenomenon occurs spontaneously, and it does not seem unreasonable to take the cessation of pulsation in the cord as the sign that the placental circulation has in fact been arrested. This arrest may actually be established before all pulsation ceases, as the only fact that we are entitled to assume from the presence of pulsation is that the vessels are patent between the heart and the point at which the pulsation is felt. This consideration does not, in my opinion, affect the main issue.

Accepting the evidence for oxygen lack being the prime stimulus to respiration in the newborn infant, is it too much to assume that this lack is brought about by normal physiological mechanisms, and should not depend on the arbitrary application of some external obstruction to the vessels of the cord? It is, after all, a commonplace of practical observation that in the vast majority of normal deliveries the child starts to breathe shortly after birth, and before any outside mechanical interference with the cord has been undertaken. It seems to me that as labour proceeds a time must come when the placenta is unable to adapt itself to the changed size and shape of the uterine placental site, consequent on the reduction in size of the uterus. This must lead to a progressive separation of the placenta that would be sufficient to initiate the requisite oxygen lack.

Dr. Chisholm has suggested that the newborn baby is in danger of bleeding into its own placenta and possibly from placental tears. Some light on these risks might be obtained from records of precipitate births involving spontaneous rupture of the cord and the consequent possibility of hæmorrhage from the main umbilical vessels. In any event it would seem that to stress the propelling action of the heart as the sole motive power in the placental circulation after birth is to neglect entirely the suction effect that must be exerted by the increase of negative pressure in the thorax that accompanies the child's first inspiratory effort. An immediate ligature of the cord, as advised by Dr. Chisholm, may well prevent this suction mechanism from coming into play, and for this reason and in view of the considerations outlined above I would end with a strong plea on behalf of those whose practice it is to defer such an operation until at least "the cord has ceased pulsating."

Baldock, Herts. J. H. MOYNIHAN.

IMMUNISATION AGAINST TETANUS

SIR,—In your last issue Dr. Evans makes a comparison between the antitoxic response following two inoculations of tetanus toxoid and that noted subsequent to a third injection administered 10 months after the original doses. It is noted that there is a rapid, and in many instances a profound, increase in antitoxic titre as a result of this further stimulus of the immunising mechanism. In consequence of this observation it is suggested that it might be worth the added administrative difficulties to give this third injection.

It may be of interest to note that some time prior to my relinquishing the direction of the pathological services of the Army five months ago an instruction was issued to the effect that a third injection of tetanus toxoid was to be given 12 months after the original inoculations. As, no doubt, you are aware active immunisation against tetanus by the two dose method was introduced as a routine procedure in 1938 in the British Army. Such information as we have at present lends colour to the view that it has had an influence on the prevention of tetanus amongst the battle casualties sustained in the Belgian campaign. It is probable that the third injection now given will so increase the antitoxic level that this protection will still further be enhanced.

The present heavy fighting in the Western Desert should yield some data relevant to this method of prophylaxis. Information on this subject will, therefore, be awaited with interest.

Walton-on-Thames. H. MARRIAN PERRY.

SIR,—In your opportune leading article of Nov. 22 you do not mention that simultaneous passive immunisation with antitoxin and active immunisation with tetanus toxoid is provided for in United States Army and Marine orders. The British Army gives two doses of toxoid six weeks apart. A wounded British soldier will at once receive one emergency dose of antitoxin. If his record then shows that he was previously immunised, nothing further will be done, but if he is not already actively immunised he will get, I understand, three weekly injections of antitoxin as at the end of the last war. The U.S. Army gives—not only to those who so opt, as in the British Army, but to all personnel—an "initial immunisation" of three doses of toxoid three weeks apart followed by a "stimulating dose" of 1 ml. at the end of the first year, or prior to departure for war, if the departure occurs more than six months after the first yearly dose (*War Medicine*, May 1941, p. 426). An "emergency stimulating immunisation" is given for battle wounds or secondary operations. Antitoxin is not used except for the treatment of clinical tetanus. If those who have not been previously immunised are wounded they receive a single dose of antitoxin and a dose of toxoid plus two further doses as in initial immunisation. The U.S. Army and the U.S. Marines bestow their affections where they will—one prefers the air-cooled airplane engine, the other the liquid-cooled. The Army uses toxoid, the Marines use the insoluble alum-precipitated tetanus toxoid, and give to all personnel two doses of alum-precipitated toxoid four weeks apart. A further 1 ml. is injected about a year later or in the event of a severe battle or non-battle wound or burn, or if a secondary operation becomes necessary. Antitoxin is used for the treatment of clinical tetanus, or for inade-

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quately immunised men, to whom a dose of tetanus alum toxoid is given at the same time, and the second dose a month later. The American Army and Navy thus both aim at passive plus active immunity at the same time. The factors are not the same as those described in the *British Medical Journal* of Nov. 20 (p. 717) by a group of investigators studying the immunology of diphtheria. If antitoxin and toxoid are given at the same time, the toxoid cannot act much while the antitoxin is present. Until it is got rid of there is a dangerous interval; the individual is exposed to infection if in contact with a carrier before the toxoid can act and produce active immunity. But in tetanus the man is not exposed during this time to external infection.

In passing, I would guess that the excellent American *War Medicine* has not yet gained full currency here. Among other items, a recent number tells that the American fighting man will have his blood-group marked on his card, as in the Australasian Army.

X.

SCIENCE OR ART?

SIR,—In your issue of Nov. 15 Professor Plesch stated that "we have lost confidence in our intuitive abilities and do not use or rely on our five senses sufficiently; this is regrettable because medicine must always remain an art to which science is only the servant." He then goes on to state that "our judgment must depend partly on imaginative intuition, and we can only pass on to the student the method of making the bricks from which he must build the diagnosis." I feel myself that we have rightly lost confidence in our intuitive abilities. Intuition is subjective and should be distrusted by the scientific mind. I disagree that medicine must always remain an art to which science is only the servant. It would be better both for the practitioners of medicine and those practised on that it should be primarily a science and secondarily an art. For some thousands of years medicine was an art; it was only when it tended to become a science that it began to command respect from intelligent minds. A teacher can pass on to his students a scientific attitude of mind which will ultimately benefit medicine and benefit his patients.

Gorseinon, Swansea. G. E. DONOVAN.

PARADOXICAL CEREBRAL EMBOLISM

SIR,—I am interested in the case recorded by Dr. Porter in your last issue but venture to dispute his diagnosis. It seems to me much more probable that the case was one of cerebral thrombophlebitis. I have published a comparable case (*Brain* 1937, **60**, 531) in which following thrombophlebitis in the left leg symptoms of increased intracranial pressure developed which were presumed to be due to thrombosis of the superior longitudinal sinus. Thrombophlebitis even if widespread is not necessarily accompanied by fever, nor is the lung often involved when thrombophlebitis arising in the lower part of the body subsequently affects the cerebral veins. Indeed in the puerperal cases pulmonary involvement appears to be the exception rather than the rule. The spread in such cases is probably by mural thrombophlebitis, along the intravertebral veins, as Purdon Martin has suggested (*Brit. med. J.* 1941, **2**, 537). The experimental work of Batson (*Ann. Surg.* 1940, **12**, 138) upon which this suggestion was based strengthens the belief which I have held for some time that many cases of hemiplegia which in the past have been attributed to arterial embolism, thrombosis or hæmorrhage, have in reality been due to cerebral thrombophlebitis. I would add that the rapidity of recovery in Dr. Porter's case is an additional argument in favour of the diagnosis of cerebral thrombophlebitis as opposed to cerebral embolism.

Oxford. C. P. SYMONDS.

LONDON HOSPITAL.—An award of the Hutchinson triennial prize will be made in 1944 for a dissertation on the investigation and treatment of sciatic pain. Candidates must be full students of the hospital, but not necessarily of the medical college, and they must have registered as students not more than ten years ago. Dissertations should be submitted to the secretary of the hospital medical council by Oct. 31, 1944.

Medical News

Royal Society

The King has approved the recommendations made by the council of this society to award a royal medal to Prof. E. L. Kennaway, F.R.S., for his investigations on production of cancer by synthetic substances.

The Copley medal has also been awarded to Sir Thomas Lewis, F.R.S., for his experimental researches, in the clinic and the laboratory, on the heart and the circulation and their disorders; and the Davy medal to Dr. H. D. Dakin, F.R.S., for his work as a pioneer in biochemical research and especially because of his fundamental contributions to the study of intermediate metabolisms.

Royal Society of Medicine

There will be a general meeting of the fellows of this society on Tuesday, Dec. 2, at 3.30 P.M. On Dec. 3, at 2.45 P.M., at the section of history of medicine, Mr. Charles Elcock, F.R.I.B.A., will read a paper on hospital building—past, present and future. At 2.30 P.M., on the same day, at the section of surgery, Dr. E. G. L. Bywaters and Mr. Ronald Belsey will open a discussion on the effects on the kidney of trauma to parts other than the urinary tract including crush syndrome. The section of laryngology will meet at 10.30 A.M., on Dec. 5, to discuss the effects of flying on the nose and ear. The opening papers will be read by Wing-Commander J. F. Simpson, Group-Captain E. D. D. Dickson, Squadron-Leader D. B. Fry, Squadron-Leader J. E. McGibbon and Squadron-Leader R. H. Winfield. At 2.30 P.M., on the same day, Dr. Z. Mennell and Dr. Ronald Jarman will open a discussion at the section of anæsthetics on the present position of ether.

Health Films in America

The American Film Center, 45, Rockefeller Plaza, New York, has opened a section on films in health education and medicine, to which the Rockefeller foundation has promised a three-year grant. Dr. Adolf Nichtenhauser, who is in charge of the section, has been working on educational cinematography for many years and before joining the centre he was on the staff of the National Tuberculosis Association and the New York Tuberculosis and Health Association. The new section will be a clearing-house and information centre on the use and production of medical films for laymen and doctors. It will from time to time publish lists of recommended films, and it will develop a production programme with other agencies.

General Practitioners of West Ham

The practitioners of West Ham met on Nov. 19, to discuss the necessity for united and sustained action to meet the requirements of general practitioners as a body, in view of possible alterations in medical practice due to changing economic conditions. Dr. Robert Poots was in the chair and 83 doctors were present. Dr. Poots discussed the raising of the income limit for N.H.I.; the medical care of dependants of members of the Forces; the inadequacy of the recent addition to the N.H.I. capitation fee; the fact that less than 5% of the population earned more than £500 per annum; the effect of increasing income-tax burdens on the patient; and how these factors must influence the future of medical practice.

Dr. Philip Inwald, of Islington, told the meeting what had been done in his district and in the City area in organising the practitioners. Dr. H. C. Boyde welcomed the awakening professional interest in social and economic problems affecting medical practice. The B.M.A. had suggested it was desirable to form discussion and study groups, to plan future medical progress. Dr. M. J. Murphy thought extension and modification of the existing system might give a possible solution. Other speakers stressed the need for organisation among general practitioners, to make the wishes of the largest body of medical opinion in the country operative through the leading medical organisations. The following resolution, proposed by Dr. H. A. Hannon was carried unanimously, and practitioners from East Ham who were present associated themselves with it:

That a coördinating committee be elected by the general practitioners of West Ham, to link up with other practitioner coördinating committees throughout the country, to watch over the interests of general practitioners by every accepted means, to formulate their requirements and forward them to the Medical Planning Commission.

A committee of twelve practitioners was elected, instructed to get to work as soon as possible, and report progress at the next meeting, which will be held at an early date.

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Hospital Saving Association

Despite war-time difficulties the number of contributors to this association on July 31, 1941, was almost 1,690,000 and the income for the year was £970,000. This year the association has paid the London hospitals 9*s.* for each inpatient day and 7*s.* 6*d.* for each outpatient, except when these figures exceeded the 1939 statistical cost. But fewer of the association's contributors have been ill, only 3% compared with 6% in 1938–39, while the outpatients had fallen from 20 to 11·2%.

Naval Honours

The D.S.C. has been awarded, for courage and resolution in operations in Mediterranean waters, to Temp. Surgeon Lieutenant E. R. L. Davies, M.R.C.S., R.N.V.R., H.M.S. *Manchester*, Temp. Surgeon Lieutenant C. J. Vaughan, M.B. Dubl., R.N.V.R., H.M.S. *Forster*, and Temp. Surgeon Lieutenant E. J. Yates, M.B. Manc., R.N.V.R., H.M.S. *Fearless*.

Harben Lectures

These lectures, which are delivered under the auspices of the Royal Institute of Public Health and Hygiene, will this year be held in Canada. On Dec. 1, 2, and 3, at 4 P.M., E. V. McCollum, Sc.D., professor of nutrition at Johns Hopkins University, will give them at the University of Toronto, and he has chosen as his subject nutritional science and public health.

Pituitary Extracts

The supplies of pituitary extract issued by the Ministry of Health for use in E.M.S. hospitals and first-aid posts carry the expiry date of Oct. 26, 1941. But the Medical Research Council have tested samples and report that where supplies have been kept under ordinary conditions at normal room temperature they may be used with safety for a further twelve months.

Anglo-Soviet Medical Committee

The Anglo-Soviet Medical Committee appeals to all who have any surgical instruments which they can spare to send them as soon as possible to the secretary of the Joint Committee for Soviet Aid, 171 St. Stephen's House, Cannon Row, Bridge Street, London, S.W.1. The need is urgent, for the manufacturers can supply only a limited number. Instruments which require to be re-plated or repaired will be accepted with gratitude and will be restored to good condition before being forwarded to the U.S.S.R.

Among the instruments wanted at once are:

Artery forceps of every description.
Record syringes and needles (international standard pattern).
Needles of all kinds (including intravenous, blood-transfusion, hypodermic and spinal).
Bone forceps.
Scissors of every description.
Scalpels and amputation knives.
Towel clips.
Plaster cutters.
Dissecting forceps.
Tracheotomy tubes.
Aural forceps.
Abdominal retractors.
Bullet or swab forceps.
Volkmann retractors.
Aneurysm needles.
Sterilisers and autoclaves.
Surgical needle holders.
Dental instruments.

Dusting Powder for Babies

The Board of Trade in consultation with the Ministry of Health have agreed to allow manufacturers of toilet preparations to supply dusting powder for babies under the name of "baby powder," without the addition of any other words. It must be sold as packed by the manufacturers and must not contain perfume, essential oil or colouring matter. It must be composed of the silicates of magnesia and alumina and may also contain a small proportion of boric acid. The powder will be distributed only to hospitals, medical practitioners and registered pharmacists and may be supplied only to people who really need it.

Communal Meals in Stirlingshire

On Nov. 14 Mr. Thomas Johnston, M.P., Secretary of State, opened the fourth feeding centre for the county at Stirling. Centres are already open at Falkirk, Kilsyth and Grangemouth, and almost 12,000 meals a week are served to school-children. The Stirling centre will be able to serve every day 3000 meals to children and 3000 meals to adults. In a short time Stirlingshire will have seven centres with a daily output of 10,400 meals for school-children and 9400 for adults. Hot meals will be distributed by insulated containers to all schools in the county and to selected centres where there is likely to be a demand, and the director of education for the county, who is in charge of these feeding arrangements, hopes to be able to supply the mining community in districts where no facilities for pit-head canteens exist.

Notes, Comments and Abstracts

NURSES CONSIDER THEIR PROFESSION

THE inaugural meeting of the Nursing Reconstruction Committee, under the chairmanship of Lord Horder, was held on Nov. 24 at the Royal College of Nursing. This body is composed half of delegates appointed by the college and representing different aspects of nursing, and half of delegates from kindred associations including the British Medical Association, the Society of Medical Officers of Health, the Nuffield Trust, King Edward's Hospital Fund for London (Nursing Recruitment Centre), Local Authorities' Nursing Services Joint Committee, the Medical Women's Federation, the British Federation of Business and Professional Women, the National Association of Administrators of Local Government Establishments, the Trades Union Congress, the Incorporated Association of Hospital Officers, the Hospital Matrons Association, the Queen's Institute of District Nursing and many others. The delegates are to consider ways and means of implementing the recommendations of the Athlone Committee and to recommend such further adjustments as the present situation and post-war reconstruction may demand. It is stimulating to see this extremely practical approach. It is easy—or relatively easy—to make recommendations for amending the nursing profession, since many defects in the terms of service are as widely known as they are of long standing. But to settle down to convert opinion into action is a different and worthier task. In welcoming the delegates Lord Horder reminded them that even in the short interval since 1939, when the interim report of the Athlone Committee appeared, important developments had occurred, among them the setting up of a division of nursing at the Ministry of Health; but there was much to be done. He pointed out that recruitment falls short of demand, education of nurses is cramped by the economic needs of the training institutions, prospects are too poor to attract women of ability, and conditions of service are not everywhere what they should be. The profession looks for the establishment of negotiating machinery on the lines of the Whitley Councils to bring such conditions into line. The new committee has a great work before it and we wish it well.

TUBERCULOSIS IN SOUTH AMERICA

ELEVEN of the Spanish-American countries took part in the fifth Pan-american Congress for tuberculosis held at Buenos Aires and Cordoba at the end of last year. In his presidential address Prof. G. Sayago said that these new countries had a common geographical, racial, economical and social background, and the statistics submitted to the congress showed that at any rate in their rural districts they were faced with common problems in the control of tuberculosis. In the larger cities of South America the problems connected with the disease were more comparable to those of the older nations. In the towns the incidence of the disease is high and as rural districts become industrialised they are exposed to infection; its spread among children is disquieting. But the congress did not consider that heredity was an important factor and infection by the placenta was rare. Non-pulmonary tuberculosis does not show the same clinical picture as in Europe, for surprisingly often it is associated with active or incipient pulmonary infections. These patients should be treated in special sections of the hospitals. The next congress will be held in Habana in 1943 and the subjects for discussion will include the value of BCG vaccination, initial stages of tuberculous infections; and the treatment of pulmonary cavities.

At the congress it was emphasised that the number of beds available in South America was insufficient for the number of tuberculous patients. To implement her share of the campaign against the disease the Argentine Government has set up a national committee, working under the department of health, which will coördinate the work of sanatoriums and laboratories receiving grants from the government, and establish new sanatoriums in rural districts in the interior. According to official figures there are only 5000 beds available in the republic and these can accommodate only a third of the patients, but the results achieved so far have been

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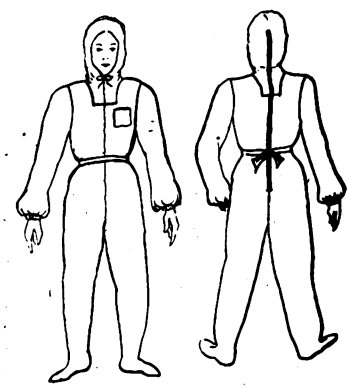
good, and in Buenos Aires the death-rate from tuberculosis has fallen from 3·14 per thousand in 1938 to 2·79 in 1929.

The miraculous remedy against tuberculosis has once more been discovered. This time by Jesus Pueyo, a Spanish medical student. For a time he did research work in the laboratory of microbiology in Buenos Aires and he claims to have discovered a new vaccine, which was announced in the lay press in a sensational manner. The minister of the interior urged him to demonstrate its preparation at the National Institute of Bacteriology, but Pueyo made conditions which were unacceptable to the scientists. The faculty of medicine also tried to examine the vaccine, but this also came to nothing as Pueyo refuses to permit animal experiments and insists on being allowed to try his vaccine on human beings. The use of the vaccine has therefore been forbidden in Argentina and Pueyo has been fined for its unauthorised distribution.

TO DEFEAT THE TYPHUS-BEARING LOUSE

THE Ministry of Health (memo 252/Med.) puts us on our guard against the possible arrival of louse-borne typhus in this country, in company with refugees, prisoners of war and returning travellers. The body-louse and the head-louse are both probable vectors. Diagnosis depends on the sudden onset, high temperature, the appearance on the 4th or 5th day of a rash which spares the face, and a torpid or maniacal mental state. The Weil-Felix reaction can be obtained by the end of the first week and sometimes earlier. A strong reaction in a dilution of 1 in 80 or 1 in 100, obtained by a naked-eye reading, may be taken as positive, and during the later stages of the disease the titre rises to 1 in 1000 or even higher. At the other end of the scale, any increase in the agglutinating power of the serum, established by examinations at 2-day intervals, is significant even at a titre of 1 in 50. A vaccine against infection is available but its value in the field has not been tried. It is to be used at present only by those working on typhus teams and is to be given in three doses of 1 c.cm. at weekly intervals. If typhus does reach this country it is most liable to break out in crowded areas. Several of the large cities have been asked to organise typhus teams, each of which is to include the medical officer, 4 nurses, 1 ambulance driver, 1 ambulance attendant and 1 or more sanitary inspectors and trained disinfectors. The team should be duplicated so that absentees can be replaced.



All team members are to be provided with protective clothing consisting of a one-piece garment with a hood fastening down the back, preferably with a Zipper. A tape runs round the face aperture of the hood and ties under the chin, and tapes and elastic draw the sleeves closely round the wrists. Gum-boots and long fabric gloves are also to be worn, and masks if desired. Protective clothing is absolutely necessary for members of the team, since any of them may come into contact with typhus-infected lice. During removal to hospital the patient should be enveloped in a large sheet, and should travel in a vehicle which is easy to free from lice. The staff engaged in admitting the patient to hospital are particularly exposed to danger, and the greatest care of all should be taken during this time. The patient must be admitted to a special bathroom, stripped, deloused and clad in hospital clothing before being taken to a ward set aside for the purpose. Delousing must include not only complete disinfestation of the patient's clothing but careful delousing of his person, close cutting of the hair, shaving where necessary and careful bathing. He must be thoroughly soaped all over and cleansed in such a way that all lice are destroyed. In the hospital a room must be provided where the staff can change into protective clothing. After use the clothing must be left there for disinfection; the staff must pass next to a bath-room and finally to the room where their ordinary clothing is kept.

Officers with experience of typhus in the medical department of the Ministry of Health or in the L.C.C. will help to advise on diagnosis, and arrangements have been made for a mobile team from the American Red Cross—Harvard Field Hospital Unit—to give help in diagnosis and control in any part of England or Wales. Medical officers of health are advised to arrange for beds to be available in the larger isolation hospitals. The origin of infection must be carefully traced and all those who have been exposed to risk must be deloused and kept under observation for three weeks. Heavily infested people may have to be deloused a second time after an interval of ten days to ensure destruction of lice hatched from surviving eggs.

INCIDENTS AND GAS

HANDBOOKS to prepare the peaceable against the demands of war are the fashion just now; and a good thing too. No one can say "Why wasn't I told?" Three such warning messengers have lately been launched by Jordan and Sons. Mr. W. F. F. Shearcroft's 24-page booklet (War Gases: Learn and Live. 6*d*.) deserves a wide sale. It includes all the man in the street need know about gas, and by means of excellent little illustrations and apt descriptions paints as vivid a picture of a gas attack as you can hope to get for sixpence. Mr. T .E. Browne's 48 pages (Conduct of A.R.P. Incidents, 1*s*.) contain little that will be new to doctors, but the book may have uses for incident officers. So will the folded card (Duties of an Incident Officer, 1*d*.), by Mr. R. D. Wormald and Mr. J. M. Young, but this again does not aim at instructing the casualty services.

LIQUEMIN HEPARIN.—Roche Products Ltd. have changed this solution, which is now about 2½ times as strong as the old solution. The potency of the new solution will be stated in terms of Toronto units, viz., 1,000 T.U. per 1. c.cm., or 5,000 per 5 c.cm. phial.

Births, Marriages and Deaths

BIRTHS

COPE.—On Nov. 18, at Ongar, the wife of Major R. W. Cope, R.A.M.C.—a daughter.

KERR.—On Nov. 16, at Inverness, the wife of Dr. England Kerr, —a daughter.

SHAW.—On Nov. 21, at Berkhamsted, the wife of Dr. C. Carter Shaw —a son.

SMALLEY.—On Nov. 17, at York, the wife of Captain C. S. Smalley, R.A.M.C.—a son.

TEMPLETON.—On Nov. 22, at Leicester, the wife of Major William Templeton, R.A.M.C.—a son.

WILLIAMS.—On Nov. 15, at Oxford, to Joyce Beverley Williams, M.B., wife of Squadron-Leader Denis Williams, M.R.C.P., R.A.F.V.R.—a daughter.

MARRIAGES

SYMON—MOORE.—On Nov. 20, at Quainton, David Symon to Jocelyn Moore, F.R.C.S., R.A.M.C.

DEATHS

BLACK.—On Nov. 23, at South Croydon, Thomas Anthony Black, M.B. N.U.I.

CHIDELL.—On Nov. 18, at Hythe, Claude Churchill Chidell, M.B. Lond., first superintendent of Pinewood Sanatorium.

GOFF.—On Nov. 21, at Ventnor, Isle of Wight, Bruce Edward Goff, M.B. Glasg., late of Ovington Gardens, London.

LINNELL.—On Nov. 18, at Northampton, Alfred Linnell, M.R.C.S., aged 80 years.

PILKINGTON.—On Nov. 21, at Parkstone, Dorset, Frederick William Pilkington, M.R.C.S., D.P.M., aged 83.

SMYTH.—On Nov. 23, at Bognor Regis, Ernest Jackson Smyth, M.D. Lond.

SANDEMAN.—On Nov. 22, at Hertford, Muir Sandeman, M.B. Edin., aged 75.

WEST.—On Nov. 20, at Queen Mary's Hospital, Carshalton, Henry Owen West, M.D. Lond., F.R.C.P.

Appointments

CLINE, H. R., M.B. N.U.I., D.L.O.: surgeon to the ear, nose and throat department of the Mildmay Mission Hospital, London.

HODGES, W. V. A., L.D.S.: dental officer for Dorset.

MAWSON, EDNA E., M.D. Lpool: temp. asst. T.O. for Bristol and R.M.O. at Frenchay Park Sanatorium.

PHILLIPS, H. I., L.D.S.: dental officer for Dorset.

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ORIGINAL ARTICLES

FROSTBITE AND KINDRED ILLS*

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IN time of peace, doctors in England need no knowledge of frostbite. The disorder occurs so rarely that many never see it. In war it becomes an important military factor, either in its classical form or as the closely allied condition of trench-foot. It was a major cause of Napoleon's retreat from Moscow, during which it was described by the surgeon Larrey. Should the Germans in Russia be forced to dig in this winter, frostbite may be once more a potent weapon against Russia's enemies. Frostbite crippled thousands and killed many in the Balkan wars which immediately preceded the war of 1914–18, but the lessons these cases taught were not learned in time by our own army, despite the efforts of Colonel Max Page (1914); though frostbite is almost always preventable, 84,670 cases occurred in the British Army alone. In the week ending Dec. 16, 1916, 3104 frostbitten men were admitted to medical units in France and Flanders, and 2521 of these were sent to the base. The blizzard of November, 1915, caused 15,900 cases in Gallipoli and 998 in Serbia (Mitchell and Smith 1931). Thanks to a few officers of the R.A.M.C. and a few commanders who were prepared to accept their advice, there were some units in all theatres of war which suffered little, if at all. In the North Russian campaign between September, 1918, and September, 1919, only 48 men were frostbitten. A number of cases occurred early in the present war, chiefly in the R.A.F., but adequate clothing and the heating of aeroplanes soon reduced the incidence to very small figures. Nevertheless it is always possible that the British Army may be called upon to fight in conditions of cold and damp and in mountainous countries, where only awareness of the danger and knowledge of its causes and treatment will prevent numerous casualties.

In the present war, two other conditions have been recognised which are in close relation to frostbite and trench-foot. These are "shelter-foot," often seen among shelter dwellers in London in the winter of 1940–41, and "immersion-foot," commonly observed in those who, after shipwreck, have been forced to spend long periods in water-logged boats.

TRUE FROSTBITE

The onset of true frostbite may be sudden or gradual.

Sudden frostbite can be studied in comfort by anyone who will take the trouble to squirt ethyl chloride at a friend's nose. Dermatologists often produce it by applying a stick of carbon-dioxide snow firmly to the skin. In more natural surroundings it develops in exceptionally cold weather, especially in a high wind, or when the exposed skin is brought into contact with cold metal such as an ice-axe, a rifle, a spoon, or the shutter-release of a camera. A sting like that of a wasp is usually felt, but sometimes it is painless. The skin is white and crystalline. If it is observed at once and a warm hand clapped on it, no harm may be done. During thawing, a red area appears around the frozen patch which gradually invades it. The surroundings gradually return to normal, leaving the patch red and sharply defined. Shortly afterwards itching and swelling begin. The weal may take many hours to subside, or blistering may follow and even deep gangrene of the skin. The flush is due to the opening up of arterioles by the release of H-substance from the damaged area (Lewis and Love 1926).

Gradual frostbite may occur on exposed skin or on well-clothed parts. The burning sensation of extreme cold dies away and a pleasant numbness takes its place. At this stage the skin may appear normal or may be white and waxy. If freezing continues, there is destruction of tissue, blood-vessels give way, œdema and hæmorrhage develop and the vitality of the tissues is destroyed—a course of events which may occasionally be delayed by cold so extreme that the normal contour of the part is preserved as in marble. In either form, thawing usually begins before extreme damage has been done, and is itself responsible for the ultimate damage. This is the danger period. As in sudden freezing, a flush surrounds the frozen area and gradually invades it, till the normal or white skin becomes red. Swelling begins when transudation takes place from the damaged vessels. In extreme cases whole blood may escape into the tissues and the skin become darkened or purple; blisters then form, the blebs containing straw-coloured fluid or whole blood. The true severity depends on the depth of freezing and—more important—the amount of transudation. In most cases the damage is only skin deep or involves only the terminal phalanges. The appearance is always unduly alarming to the inexperienced. A frostbitten hand may have precisely the appearance of a hand in which the main arteries have been blocked by embolism, but arterial pulsation can usually be felt and recovery with but little tissue loss is the rule if sepsis is avoided. During the stage of aseptic recovery the unviable tissues become black, hard and painless, and finally—sometimes after weeks—strip off, leaving healed skin beneath. The viable but affected tissues gradually recover their normal appearance, but may be hypoæsthetic, or paræsthetic and hyperæsthetic for months. Even in a mild case with little or no tissue loss, these disturbances of sensation may occur, and interference with the blood-supply to the nail-bed may result in temporary cessation of nail growth and loss of the old nail some months later. Many years may pass before nail growth becomes normal again.

TRENCH-FOOT

Larrey was the first to describe trench-foot, which in previous wars has been the most important form of frostbite; he observed that it was less common at extremely low temperatures than when the temperature varied about freezing-point so that the ground though always cold was usually muddy. In "The Medical History of the Crimean War" (1858) it is stated that a large proportion of the casualties from this cause occurred when the temperature was above freezing-point. It was realised even at that time that in addition to cold other factors were involved, especially damp, constriction and stagnation of the circulation, fatigue, malnutrition and scurvy. The author wrote:

> The labours and guards of the trenches were those which more especially involved that severe and protracted exposure which was favourable to the occurrence of gangrene. The men in the trenches and advanced parallels were so much restricted in their movements and were for the most part so little able, in the presence of a vigilant enemy, to walk about or in any other way to assist the circulation of the blood that they were under the necessity of remaining quiet in the least exposed position, and frequently this position happened to be the bottom of a trench knee-deep in mud and water or half-filled with snow.

Yet, despite this clear warning, we lost thousands of soldiers in the winters of the last war. One contrite colonel, formerly of the R.A.M.C., has told me how at first he forced men with sore feet to return to the trenches. He realised his error, but many never did.

Trench-foot is almost identical with gradual frostbite. There are variations in the mode of onset but the main features are the same: numbness followed by swelling and ultimately considerable pain. It is important to remember that the feet may be almost free from pain until the boots are removed, when transudation and swelling take place rapidly and the pain may become intense. Some men, slightly affected, found that after a few days pain and swelling disappeared, and that they could return to the trenches, only to succumb later to attacks of steadily increasing severity. Others were too severely crippled to return.

SHELTER-FOOT

In November of last year, Knight (1940) drew attention to swelling of the feet in people who had spent the

* Based on a lecture delivered at the British Postgraduate Medical School on Feb. 6, 1941. Reference is occasionally made to experiments, to be published fully later, conducted with the aid of a grant from the Medical Research Council, to which my thanks are due.

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night in a sitting position without compensating rest in a horizontal position during the day. The condition was further described in a leading article in THE LANCET of Dec. 7, 1940 (p. 722). Beginning in the feet, the swelling extended up the leg; it was painless at first, but afterwards became painful and in some cases the skin became shiny and red. Knight observed that the condition did not arise in wardens who, though exposed to the same degrees of cold and damp, were frequently on their feet, and that most of his patients had used deck-chairs, the wooden bars of which had exerted prolonged pressure on the popliteal fossa. That pressure was an ætiological factor was shown by the observation that those who sat with one leg crossed over the other developed swelling in the lower leg only. Knight described the appearances of this ailment as reminiscent of trench-foot. I saw one of these patients in consultation with him.

CASE 1.—A middle-aged baker. Both feet were very œdematous, the swelling extending a short way above each ankle and gradually fading into the thickness of the calf. The skin of the feet and the lower half of the legs was covered with a very fine petechial rash. On applying Göthlin's test to the arm, it was found that the patient's general capillary permeability was greatly in excess of normal, and, in the absence of any other discoverable abnormality, the question of dietary deficiency naturally arose. The patient had "studied all this diet nonsense" and come to the conclusion that it was "all a doctor's racket." He particularly resented the efforts of doctors to suppress the white loaf, which he considered the only bread fit to eat. He disliked green vegetables, but ate them occasionally to please his wife. He never ate fruit of any kind. He worked 18 hours a day and developed the swelling of the feet after a night spent sitting on a hard chair in his bakery.

Clinical research outside hospital is notoriously difficult. Patients who are not under one's eye disobey instructions or disappear at important moments, often never to return. Further investigations on the baker were not possible and all that is known is that after a change in his diet and his chair he made a complete recovery. Four other patients were afterwards seen.

CASE 2.—A woman, who also had an increased capillary permeability. Estimation of her urinary excretion of ascorbic acid by the method of Harris and Abbasy (1937) showed deficiency of vitamin C. Treatment with ascorbic acid, 50 mg. t.d.s., was followed by a rapid recovery and the return of her capillary permeability to normal.

CASE 3.—A woman who had spent every alert sitting in a shelter, was found on inquiry to be eating a diet apparently deficient in vegetables. By Harris and Abbasy's test she did not appear to be deficient in vitamin C. She was given vitamin P in the form of hesperidin, 1 g. daily. Her legs and capillary permeability returned to normal.

CASE 4.—A woman who had been sitting up in her dining-room during alerts for 3 months and was taking a diet which seemed to be deficient in vitamin C. Her capillary permeability and ascorbic-acid excretion test were normal, however, and an opportunity to try vitamin P did not occur. Her after-history is unknown.

CASE 5.—A woman in whom only one leg—that over which she normally crossed the other—was affected was living on a diet deficient in vegetables. Her capillary permeability was increased. Advice on diet was followed by recovery and return to normal capillary resistance.

These cases suggest that in shelter-foot the most potent causative factors are venous stagnation and increased capillary permeability. Whether the latter is due to deficiency of vitamin C or vitamin P or to some other cause remains doubtful, but it is likely that, as in the Crimean war, dietetic deficiency played a part in the foot troubles of the battle of Britain. The shortage of citrous fruits (the main source of vitamin P in modern diets) may conceivably be important. We know of no action of vitamin P other than its effect of reducing capillary permeability. A deficiency in normal times might well pass unnoticed, only to be brought to light by the abnormal habits of war.

IMMERSION-FOOT

I have never seen a case of immersion-foot, and for its adequate description we must await the reports of those whose war experience has brought them greater opportunities of observing it. I gather that clinically it is almost identical with trench-foot and that the causes are the same. In recent experiments I have succeeded in producing in the tails of mice immersed for long periods in sea-water a condition histologically indistinguishable from trench-foot, and it therefore seems that prevention and treatment of the two conditions should be by the same means.

CAUSES

Cold.—Many of the effects of cold are too well known to need more than passing reference. Chilling of the body generally is counteracted mainly by endocrine and reflex nervous mechanisms, both perhaps controlled by the hypothalamus. Cold stimulates the adrenal glands, with a resulting constriction of skin vessels and diminution of heat loss. With a heat debt of less than 900 small calories per kg. the adrenaline reaction is sufficient. At the same time the thyroid is stimulated, cellular metabolism is increased and more heat is produced. With greater heat debts this mechanism is aided by reflex shivering (see Cramer 1928). Were this the whole story, general chilling would be an even more potent cause of frostbite than it is, but the general contraction of the blood-vessels of the skin may be locally overcome by mechanisms which have been elucidated by Sir Thomas Lewis and his associates. Freezing of the skin results in the release of H-substance from the damaged area, which causes local vasodilatation (Lewis and Love 1926), a mechanism which can be observed in the colour changes of sudden frostbite. An increased blood-flow through the extremities is also produced by the opening of arteriovenous anastomoses in the skin (Grant and Bland 1931). It is of great clinical importance that local vasodilatation may fail if the whole body is severely chilled (Lewis 1931).

The effects of cold with special reference to frostbite were studied by Rischpler in 1900. He froze animal tissues by the application of ice and salt and investigated the results microscopically at various intervals. Degeneration occurred early in the cells of the vessel walls, with swelling of the connective tissues, and vacuolation of the muscle-fibres in the media. There was œdema, but no sign of thrombosis. His findings were confirmed with less severe freezing by Smith, Ritchie and Dawson (1915), who showed that the chief, and only important, effect of cold short of total destruction of the tissues is on the vessels. These show dilatation of the lumen, swelling of the intima and vacuolation in the media; there is no thrombosis. In other tissues, the effects depend on œdema—in other words, on transudation from the blood-vessels. The initial contraction of the blood-vessels due to cold is rapidly supplanted by dilatation of the damaged vessels. An excessive amount of fluid is poured out into the tissues and there may even be rupture and hæmorrhage. The fibrous bundles of the connective tissues are separated by fluid and become swollen and disintegrated. Other surrounding tissues share this fate in varying degree. According to these workers, the effects of mild wet cold differ only in degree from those of severe dry cold short of actual freezing. Their conclusions are of the more importance because they succeeded in producing in the feet of their rabbits conditions closely similar to some forms of frostbite in man.

In 1917, Lake, in a beautiful series of experiments with a large variety of tissue-cultures of man and other animals, drew a hard and fast distinction between degrees of cold which solidified tissues (sudden frostbite in clinical terminology) and lesser degrees. His critical temperature was − 6° C. both in cultures and in tissues in their normal relationship with vessels and nerves. It is interesting to compare the observation of Brahdy (1935) that men working in the streets of New York are not frostbitten even in a high wind till the temperature falls to − 4·4° C. Below − 6° growth of Lake's cultures ceased, blood was hæmolysed, and destruction of intact skin occurred. Above it tissue-cultures retained their functional and vegetative vitality, blood-cells survived, and only a transient hyperæmia occurred in the intact human skin. At first sight these findings appear to contradict those of Smith, Ritchie and Dawson, who found quantitative differences only between the effects of prolonged mild cold and short exposures to extreme cold. Further consideration shows that the two results are not necessarily incompatible, for Smith, Ritchie and

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Dawson did not produce real frostbite by cold alone without the assistance of damp or constriction. I am at present investigating this point afresh. The two investigations agree in this, that the tissue damage is wrought by vasodilatation and exudation and not by vasoconstriction, which is a transitory phenomenon only. While the vessels are constricted, little transudation takes place, especially if the venous return is free and capillary pressure therefore low. When, by destruction of the arteriolar walls by cold, or by the passing off of the constriction as the tissues thaw, the vessels dilate, exudation and damage follow. This conception is confirmed by the observations of Lewis and Love (1926) and by my own recent unpublished experiments.

Warmth.—After the primary effects of cold the most dangerous causal element is warmth during the time of thaw. That great heat is dangerous has been recognised at any rate since the time of Larrey (1812) and is part of the folk-knowledge of the Eskimos. It is curious that the natives of the Himalayas have not learned this. I have more than once forcibly prevented Tibetans and Nepalis from roasting or boiling their chilled feet. That even slight degrees of warmth are dangerous is not realised by many even today. Smith, Ritchie and Dawson (1915) showed that when the tissues of the feet have been damaged by cold, water at only 37° C. causes a rapid œdema or a rapid increase in œdema already present. Lewis and Love (1926) showed that this œdema is excessive and injurious and went so far as to suggest the temporary obstruction of the arterial supply to frostbitten limbs. My own experiments show that gentle warmth greatly increases the amount of tissue lost after freezing.

Damp.—It has already been pointed out that, in the presence of cold mud at temperatures even above freezing-point, a form of frostbite develops which is different only in the slowness of its onset from gradual frostbite due to greater cold alone. This is in part due to the fact that water is a much better conductor of heat than air. Further, it has been shown by Lewis and Love (1926) that variations exist in the freezing-point of human skin between the extremes of − 2·2° C. and − 25° C. These variations occur not only between individuals but in the same individual at different times. They are due to the phenomenon of super-cooling—the capacity of a substance to go below its ordinary freezing-point without solidifying. Supercooling does not harm the tissues; freezing does. The capacity to supercool may be abolished by soaking the skin in water, and skin which does not supercool may be induced to do so by leaving it unwashed for a week or by rubbing in oil, an observation which explains the efficacy of whale oil as a prophylactic.

Circulatory stagnation.—Obviously the maintenance of a brisk circulation is an important preventive of cold feet. Larrey, in the Napoleonic wars, made his men take brisk exercise in the cold. The Crimean war observations have already been quoted. Nevertheless, exhausted men will often forget so simple a fact and in the trench warfare of 1914–18 constant vigilance was required, but not always shown, by platoon commanders to prevent men from standing for long periods slumped motionless against the parapets of the trenches. The venous return from the legs depending largely on muscular activity, it is necessary that this activity should be maintained if increased venous pressure, increased capillary pressure and consequent œdema are to be prevented. Active obstruction of the venous return is still more dangerous and may arise from clothing such as tight boots, tight garters and even tight gloves or socks, though puttees have at last been discarded. It may arise also from compression of the popliteal space. In the last war men were apt to sit for long periods, often to sleep, with the sharp edge of the fire-step compressing their thighs, just as in this war shelter-dwellers have compressed their thighs with the edge of deck-chairs. The same factors are undoubtedly at work—venous stagnation, caused by uneasy sleep on hard chairs, cold, and often damp, with resulting rise in capillary pressure, transudation, and, in the rare severe cases, tissue damage. Smith, Ritchie and Dawson (1915) showed that slight constriction of the legs of their rabbits by rubber bands greatly increased the destructive effects of cold.

Wind.—The cooling effect of wind, increasing the evaporation of sweat and blowing away the layer of warm air about the body, is of great practical importance. Frostbite does not occur in New York in the absence of wind until the temperature falls to − 13·3° C. (Brahdy 1935).

Anoxia.—Persons suffering from anoxia from any cause are more liable than others to suffer tissue damage from the effects of cold. The anoxia may be anæmic, as in the anæmic diseases, poisoning with nitrites or carbon monoxide, or after severe hæmorrhage; stagnant, as in heart failure and wound shock; histotoxic, as in cyanide poisoning and under general anæsthesia; or due to reduction of atmospheric oxygen pressure. The first three are chiefly important because men suffering from hæmorrhage and shock are likely to be subjected in winter air-raids to severe cold. If such a man must be given an anæsthetic—which not only renders him almost poikilothermic but depresses his tissue oxidation by interfering with the reduction of cytochrome—great care should be taken to protect him from cold.

The presence of frostbite may well tip the balance in favour of transfusion. Blood should be used rather than plasma, in order that the oxygen-carrying capacity of the blood should be increased. The fluid balance must be carefully watched, and any temptation to overdo it, and thus risk increased œdema, strongly resisted.

Anoxia due to reduced pressure of atmospheric oxygen is important because patients suffering from emphysema, pneumonia, blast injury to the lungs or the shallow breathing of neurasthenia are very vulnerable; and because of the association of low temperatures with great altitudes. At such altitudes, anoxia produces its effects not only by depriving the tissues of oxygen but by its effects on the circulation. Acute anoxia first causes an apparent increase in the force of the heart, but the effect is only temporary. The heart muscle is depressed, the blood-pressure falls and the minute-volume is reduced (Doi 1921, Schneider 1921, Barcroft 1925, Barcroft, Bock and Roughton 1921). When the supply of oxygen is deficient, the skin bears the brunt, the blood being shunted to more important organs. Thus the skin is more liable to frostbite not only because the blood carries less oxygen but because it gets less blood. The warming effect of oxygen at great altitudes is most obvious, and its effect in incipient frostbite extremely valuable (Greene 1934 and 1940a).

Nutritional deficiency.—"The Medical History of the Crimean War" (1858) drew attention to defective nutrition and concurrent disease such as fever or scurvy as predisposing factors in the production of frostbite. Captain R. F. Scott's ill-fated polar expedition was crippled by frostbite, though experienced arctic and antarctic explorers are rarely so severely smitten. The diet of the party was certainly scorbutic, a fact of which Scott had been warned. The relationship is easy to understand. The main feature of scurvy is hæmorrhage, which may show itself in any organ of the body but which is especially noticeable in the skin. The various features of the complete syndrome are becoming gradually associated with deficiency of a variety of vitamins. Thus the night-blindness often present is now recognised as a symptom of hypovitaminosis A, while evidence is emerging that the increased capillary permeability may be a combined effect of lack of vitamins C and P, lack of the former producing ecchymosis and of the latter petechiæ (Scarborough 1940). However this may be, it is clear that a deficiency of one or other of these vitamins is capable of increasing that exudation from the blood-vessels which is the most important damaging factor in frostbite and trench-foot.

In starvation, too, œdema already present may increase the damage due to frostbite. It is thought that the low protein intake results in a low concentration of plasma proteins and a consequent transfer of fluid osmotically to the adjacent tissues, but the relative importance of this factor and of the vitamin deficiencies associated with starvation has not been determined.

Trauma.—Age-old tradition demands that a frostbitten limb should be rubbed with snow. Many of those who have discarded the snow, which is probably harmless, have continued the rubbing. As I have already explained (Greene 1940b), the skin of a frostbitten limb is in a most delicate state, and the gentlest rubbing may

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well destroy its chance of survival. The tail of a mouse frozen and then gently rubbed suffers damage as severe as if it is warmed before the fire, a practice recognised as harmful. It is clear, too, that rubbing must increase the risk of infection, a complication greatly to be feared. Andrews (1941), after a trial of my methods, agreed that gentle methods give the best results.

These factors—cold, warmth after cold, damp, venous stagnation, wind, anoxia, nutritional deficiency and trauma—may all play a part in the production of the various forms of the ailment. Thus in true frostbite, the immediate cause is cold, aggravated often by wind and anoxia and occasionally by the other factors. In trench-foot and immersion-foot, damp is probably the most important factor, associated usually with cold and venous stagnation and often by the others. In shelter-foot, venous stagnation is apparently the primary cause, perhaps with dietetic deficiency as a partner and certainly often with cold and damp as assistants. Though the causes vary in relative importance from case to case, they act through a common channel—transudation from damaged blood-vessels. The prevention and treatment of the four variants can therefore be discussed together.

PREVENTION

Frostbite is usually preventable. Nowadays among experienced explorers and mountaineers it seldom occurs severely, and then only in circumstances which are beyond their control. Despite the severe conditions in various theatres of the last war, some units were almost untouched. Experience gained then should make trench-foot a rarity now, and consideration of the principles which I have outlined should greatly lessen and, indeed, have already greatly lessened, the incidence of both sudden and gradual frostbite. In the winters 1914–18, it was found that long rapid marches were dangerous, the men arriving in the trenches with feet sodden with sweat, probably swollen by their exertions and often rubbed by ill-fitting boots. Whenever possible, then, the last march should be a short one. The importance of dry socks was recognised in a number of Army orders. In an order of the First Army in January, 1915, it was laid down that every man was to carry in his pack an extra pair of socks and was to change them at least once in 24 hours. Careful attention should be paid to the construction of trenches. In many districts proper drainage will keep trenches dry even in wet weather. When this is impossible, duckboards must be provided. The men should wear gum-boots. These should not be used for long marches because they are impermeable and retain sweat. In many places in the last war, a boot store was kept just behind the front line. Men going to the trenches took off their own boots, which were marked and stored, and were supplied with dry gum-boots. On leaving the trenches, they exchanged these for their own boots. The gum-boots were dried by passing into the toes a rubber tube attached to a six-foot length of iron pipe. To the other end of the pipe was fixed a hand bellows. The pipe was laid across a brazier and a stream of hot air pumped into the toes of the boots. Whenever possible, the period of duty in the trenches should not exceed 24 or at the most 36 hours, and it should be remembered that the transfer of a man from a muddy trench to a billet does not end the danger if he continues to wear wet socks and boots. Some medical officers of the last war were able to arrange that at least once a day a pair of clean dry socks should go up with the rations to every man in the trenches. These rations should be hot; carriers working on the hay-box principle make this possible, and the supply of "Tommy's cookers" should be large.

Officers should watch for habits in their men likely to lead to trench-foot. It is dangerous to sleep sitting with the edge of the seat or fire-step compressing the back of the thigh. Whenever possible men should sleep lying down with their feet up, wearing their overcoats and as many blankets as possible. They should not stand still, but should move about, raise themselves on their toes, and in general keep the muscles of the legs in constant activity. They should be warned of the danger of touching bare metal on very cold days. Boots should be unlaced at every opportunity.

Clothes should be loose and in many layers. Two thin layers are warmer than one thick one, for the chief warmth lies in the imprisoned air. The outside layer should be of light windproof material like Grenfell cloth. Two pairs of socks should be worn, but only if the boots are large enough to take them easily. Tight socks are as dangerous as tight boots. Darned socks are dangerous because they make blisters. Boots must be kept supple with grease or heavy oil, especially at the flexure of the uppers. The gloves should be of wool, but an outer waterproof glove should be worn also, for wool is neither windproof nor waterproof. Gloves are of special importance in the R.A.F., air-gunners being particularly exposed to frostbite. Their work cannot be done in large and cumbersome gloves, but these should be carried on a string round the neck. The hands can then be protected when not in use but instantly removed when needed. It is in this way that mountaineers protect their hands during the periods of waiting on difficult climbs. Thin silk gloves worn continuously, and thus reinforced when possible, are a valuable protection if they can be kept dry. Hot packs† are dangerous. They are good protectors, but may be most harmful if frostbite has already developed. Perhaps it is a good thing that at very high altitudes they cease to function. Foot drill is necessary in cold trench warfare. It should be carried out before going into the trenches, if possible once a day or more while in the trenches, and again when leaving. During the winter of 1917–18 foot-drill centres were established, one for each brigade, near the front line.

At such centres the men sit in pairs, facing each other. Each man removes his companion's boots and socks, and if water is available washes his feet and carefully dries them. Any sores or abrasions are immediately reported to the medical officer and the man is relieved from duty till the skin is healed. It may seem that a very large number of men would be off duty for this cause for long periods, but in fact it is found that the number of casualties from foot troubles is greatly reduced. Each man then rubs into his companion's feet by a process of gentle massage a quantity of whale oil. It is no use just putting the oil on the feet: it must be rubbed in until it has disappeared. The quantity needed is 10 gallons per day per battalion. Dry clean socks are then put on.

Despite the difficulties of trench warfare and the opposition at first of many commanding officers, foot drill was carried out regularly in many units. It was popular with the men, and the drop in casualties from trench-foot finally convinced the sceptics. I recommend this Army experience to the notice of the senior service and to all who go down to the sea in ships, collapsible boats or Carley floats.

TREATMENT

If, despite all care or because of its lack, cases occur, treatment depends on the stage at which it is undertaken, not on the clinical type of frostbite. The premonitory symptom may be a white patch on the face, for which men in very cold conditions should be trained to watch. This can usually be cured by the immediate application for a few seconds of a warm ungloved hand. If feet or hands become numb no time must be lost. Boots and socks or gloves must be instantly removed and the limb warmed by placing it inside another man's clothes. Gentle massage may be used, but it should not be continued for more than a few minutes. Rubbing the affected parts, with or without snow, is extremely dangerous. Either the tissues are dead, in which case they are beyond care, or they are still alive. If they are still alive, the application of the most gentle warmth, never greater than that of the human body, will quickly restore the circulation; friction can only harm delicate and perhaps brittle tissues, and by increasing exudation increase damage. If these measures fail to restore warmth, the affected part should be thoroughly but gently cleaned, painted with an active antiseptic such as proflavine, wrapped in sterile dressings and in many layers of wool, and given complete rest. A man with only slightly frostbitten feet is a stretcher case. A frostbitten hand must be carried in a sling. Antitetanus serum should be given, for tetanus after frostbite is common and very fulminant (Andrewes 1923). The patient should be given hot food and drinks and extra

† Hot packs are metal boxes containing a chemical source of heat. At great altitudes there is insufficient oxygen for the heat-producing chemical reaction to take place.

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clothes and removed as quickly as possible to a place of comparative warmth and security. If the frostbite has occurred at a height above sea-level, whether in an aeroplane or on a mountain, pure oxygen should be given either with the B.L.B. mask or with the simpler face-piece of my design (Greene 1934b) until sea-level is reached. Thereafter, a policy of masterly inactivity should be pursued unless sepsis develop, in which event it should be treated like sepsis from any other cause. Excessive warmth should be avoided throughout, hot cradles being specifically forbidden. Between the part irretrievably doomed to gangrene (if such there be) and the part never endangered there is probably an area striving for life in a state of anoxia. Heat to this part will increase its metabolism and its oxygen requirements, and will encourage the growth of bacteria. Frostbitten parts must be kept cool.

A number of active treatments have been suggested, but are still sub judice. Short-wave treatment has been advocated by Burkmann (1934) but it is difficult to see what good could come of it. Passive vascular exercise is popular in the United States but has been little used here and nowhere under properly controlled conditions. It appears at first sight to be dangerous, for should the arterial supply to the limb be increased the capillary pressure would be further raised and transudation increased. On the other hand, if pressure-changes were used sufficient only to effect the venous side of the circulation the capillary pressure would be lowered and good might come. I hope to be able to provide some experimental evidence on this point later.

Recent publications (Soupault and Orsone 1940, Simon and Filhouland 1940, Forster and Wiederkehr 1940, Stricker and Buck 1940) have described the use of lumbar injections of procaine and allied compounds, of femoral sympathectomy, and of injections of the stellate ganglion. It is difficult to see how treatment producing vasodilatation could possibly do anything but harm in the acute stage. The suggestions of Lewis and Love (1926) that the arteries should be obstructed, and of Lake (1917) that they should be constricted are more rational. After the acute stage, healing takes place in any event, and though vasodilatation might conceivably hasten the process the treatment seems hardly worth while. Happily none of the cases reported were seen until a time when they were probably well on the way to spontaneous recovery, but it is to be hoped that without careful previous animal experiments no surgeons will be tempted to follow in the footsteps of these French colleagues.

Amputation is, in the absence of uncontrollably spreading sepsis, seldom necessary and never urgent. In the last war hundreds of limbs were unnecessarily lopped off because they were black and of alarming appearance. I have described a case (Greene 1940a) in which the feet were black and hard to 3 in. above the ankle, where a clear line of demarcation might have tempted a surgeon. Below this level the woody tissues obscured the pulsation of the arteries. I am not a surgeon and I left well alone. The gangrenous skin peeled off little by little like a sock, leaving healthy skin beneath. Two months later the little toes and the terminal phalanges of the others were amputated in the comfort of a hospital—as a matter of convenience not of necessity even then. A porter on the 1933 Everest expedition was frostbitten in establishing camp 6 at 27,390 ft. Two of his fingers were black and hard to the proximal interphalangeal joints. After a short time he refused to wear dressings. When he returned to Darjeeling he refused to have his fingers amputated; he liked them like that. Presumably they fell off in the end. We should never, therefore, amputate hurriedly any part of the body afflicted with uncomplicated frostbite. Amputation may be advisable later for æsthetic or orthopædic reasons. That question can be left to the unhurried judgment of a surgeon working amid the conveniences of a hospital at home.

SUMMARY

Frostbite and the kindred conditions of trench-foot, shelter-foot and immersion-foot are produced by combinations in differing proportions of many causes, the most important being cold and damp. Of secondary, but still great, importance are excessive warmth during recovery, circulatory stagnation, wind, anoxia, dietetic deficiencies, and trauma, especially during ill-directed treatment. By bearing in mind the causes, and especially by proper care of the feet, most cases are preventable. Those cases which occur despite all care, are usually less alarming than they appear to be.

The treatment consists of the avoidance of trauma and infection. Amputation is seldom necessary, and in the absence of spreading infection, is never urgent.

REFERENCES

Andrewes, F. W. (1923) Official History of the War, Medical Services, Pathology, London, p. 195.
Andrews, M. C. (1941) *Brit. med. J.* **1**, 763.
Barcroft, J. (1925) Respiratory Function of the Blood, Cambridge, vol. I, p. 126.
— Bock, A. V. and Roughton, F. J. (1921) *Heart*, **9**, 7.
Brahdy, L. (1935) *J. Amer. med. Ass.* **104**, 529.
Bürkmann, A. (1934) *Derm. Wschr.* **98**, 622.
Cramer, W. (1928) Fever, Heat Regulation, Climate, and the Thyroid-Adrenal Apparatus, London.
Doi, Y. (1921) *J. Physiol.* **55**, 43.
Forster, E. and Wiederkehr, I. (1940) *Mém. Acad. Chir.* **66**, 367.
Grant, R. T. and Bland, E. F. (1931) *Heart*, **15**, 4, 385.
Greene, Raymond (1934a) in Ruttledge's Everest 1933, London, p. 253.
— (1934b) *Lancet*, **2**, 1122.
— (1940a) *Ibid*, **1**, 303.
— (1940b) *Brit. med. J.* **2**, 469.
Harris, L. J. and Abbasy, M.A. (1937) *Lancet*, **2**, 1429.
Knight, B. W. (1940) *Brit. med. J.* **2**, 610; and see *Lancet*, 1940, **2**, 722.
Lake, N. C. (1917) *Lancet*, **2**, 557.
Larrey, D.-G. (1812) Memoires de Chirurgie militaire, Paris, vol. III, p. 60.
Lewis, T. (1931) *Heart*, **15**, 351.
— Love, W. S. (1926) *Ibid*, **13**, 27.
Medical History of the Crimean War (1858) London, vol. II, p. 187.
Mitchell, T. J. and Smith, G. M. (1931) Official Medical History of the War, Casualties and Medical Statistics, London, p. 88.
Rischpler (1900) *Beitr. path. Anat.* **28**, 541.
Scarborough, H. (1940) *Lancet*, **2**, 644.
Schneider, E. C. (1921) *Physiol. Rev.* **1**, 655.
Simon, R. and Filhouland, H. (1940) *Mém. Acad. Chir.* **66**, 358.
Smith, J. L., Ritchie, J. and Dawson, J. (1915) *J. Path. Bact.* **20**, 159.
Soupault and Orsoni (1940) *Mém. Acad. Chir.* **66**, 358.
Stricker, T. and Buck, F. (1940) *Ibid*, pp. 235 and 240.

THE RESPONSE TO VITAMIN K
A LIVER-FUNCTION TEST

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THE experimental evidence in support of the hypothesis that the liver plays an essential rôle in the production of prothrombin is to be found in the work of Andrus and his colleagues (1939) and of Warren and Rhoads (1939), who by total and partial hepatectomy in animals produced a profound reduction in the blood prothrombin concentration which was not affected by treatment with vitamin K and bile-salts. The observations reported here have been made during the past two years, while we were studying the effect of various preparations of vitamin K on the prothrombin level. During this study it became obvious, as has been noted by others (e.g. Butt, Snell and Osterberg 1939, Scanlon et al. 1939), that some patients with liver disease and hypoprothrombinæmia do not show a satisfactory response to oral or parenteral therapy with vitamin K or its synthetic analogues. Smith, Warner and Brinkhous (1937), from the results of an experimental investigation of chemically induced liver damage in dogs, have suggested that the plasma-prothrombin level appears to be a fairly sensitive index of liver function provided there is not an associated vitamin-K deficiency.

Of approximately 200 of our patients suspected of having hypoprothrombinæmia, 57 were diagnosed clinically as having disturbances of the liver. Among these patients were cases of portal and biliary cirrhosis, catarrhal jaundice, toxic or infectious hepatitis, and patients with intense jaundice which created a difficult problem of differential diagnosis. In attempting to assess the type and extent of liver disorder present in these cases, instead of using the blood-prothrombin level alone, we tried to come to a conclusion from a study of two sets of data. These were the initial level of the

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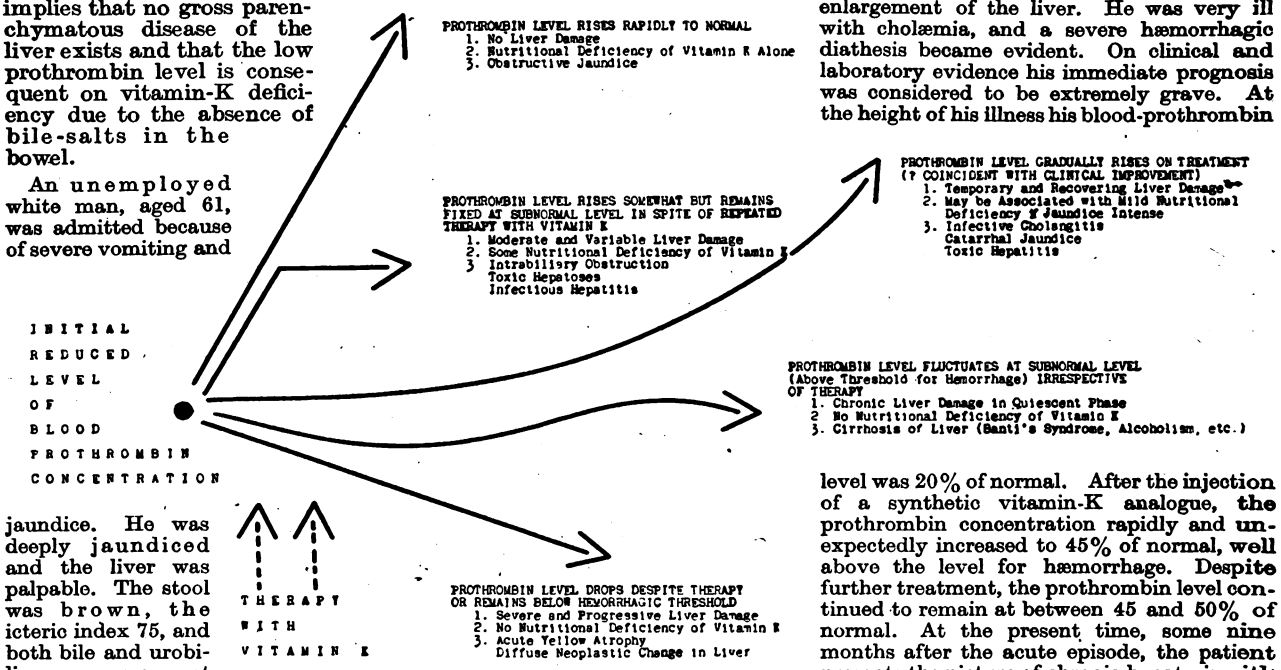
blood prothrombin before the administration of vitamin K, and the character and degree of response following its administration.

Analysis of the data accumulated showed that these 57 cases with clinically evident liver disease could be placed in five subdivisions. A schematic representation has been devised (see figure) in which the response of the lowered blood-prothrombin levels to vitamin-K therapy in the patients in each of the five groups is represented by a curve considered typical for each group.

GROUP I

The lowered prothrombin concentration in the blood rapidly (24–48 hours) returns to normal level (90–100% of normal) after therapy with vitamin K.—When intense jaundice and well-marked hypoprothrombinæmia are present, and when the diagnosis is in doubt, the rapid and complete response of a lowered blood-prothrombin level to therapy with vitamin K indicates the probability of obstructive jaundice. The good response to therapy implies that no gross parenchymatous disease of the liver exists and that the low prothrombin level is consequent on vitamin-K deficiency due to the absence of bile-salts in the bowel.

An unemployed white man, aged 61, was admitted because of severe vomiting and jaundice. He was deeply jaundiced and the liver was palpable. The stool was brown, the icteric index 75, and both bile and urobilinogen were present in the urine. Because of a history of alcoholic excesses he was thought to have cirrhosis of the liver. While under observation the stools were tan to yellow in colour, the icteric index remained at between 50 and 100, and bile and urobilinogen persisted in the urine. Because of "needle-puncture" hæmatomata a Quick prothrombin time was performed and showed a blood-prothrombin level of 25% of normal. Forty-eight hours after injection of a synthetic vitamin-K analogue the blood-prothrombin level had reached 100% of normal. On the basis of this good response to vitamin K it seemed that there was no gross disturbance of liver function and a diagnosis of vitamin-K deficiency and obstructive jaundice was made. During the next week the jaundice became more intense, the stools became pale and the icteric index rose to over 200. At laparotomy, an obstruction of the hepatic ducts was found, high up, which was considered to be of neoplastic origin. The ducts themselves were much dilated, but because of their friability no major surgical intervention was attempted. A portion of the liver taken for biopsy showed "slight acute cholangitis, with bile stasis, with no evidence of parenchymatous pathological changes." A cholangeogram performed after the operation showed dilated biliary and hepatic radicles with no dye entering the duodenum.


INITIAL REDUCED LEVEL OF BLOOD PROTHROMBIN CONCENTRATION
THERAPY WITH VITAMIN K
PROTHROMBIN LEVEL RISES RAPIDLY TO NORMAL
1. No Liver Damage
2. Nutritional Deficiency of Vitamin K Alone
3. Obstructive Jaundice
PROTHROMBIN LEVEL RISES SOMEWHAT BUT REMAINS FIXED AT SUBNORMAL LEVEL IN SPITE OF REPEATED THERAPY WITH VITAMIN K
1. Moderate and Variable Liver Damage
2. Some Nutritional Deficiency of Vitamin K
3. Intrabiliary Obstruction
Toxic Hepatoses
Infectious Hepatitis
PROTHROMBIN LEVEL DROPS DESPITE THERAPY OR REMAINS BELOW HEMORRHAGIC THRESHOLD
1. Severe and Progressive Liver Damage
2. No Nutritional Deficiency of Vitamin K
3. Acute Yellow Atrophy
Diffuse Neoplastic Change in Liver
PROTHROMBIN LEVEL FLUCTUATES AT SUBNORMAL LEVEL (Above Threshold for Hemorrhage) IRRESPECTIVE OF THERAPY
1. Chronic Liver Damage in Quiescent Phase
2. No Nutritional Deficiency of Vitamin K
3. Cirrhosis of Liver (Banti's Syndrome, Alcoholism, etc.)
PROTHROMBIN LEVEL GRADUALLY RISES ON TREATMENT (? COINCIDENT WITH CLINICAL IMPROVEMENT)
1. Temporary and Recovering Liver Damage
2. May be Associated with Mild Nutritional Deficiency if Jaundice Intense
3. Infective Cholangitis
Catarrhal Jaundice
Toxic Hepatitis

GROUP 2

The lowered blood-prothrombin level rises somewhat but remains fixed at a subnormal level, despite repeated administration of vitamin K.—This group of jaundiced patients have acute or subacute parenchymatous liver damage of a moderate and variable degree. In them, swelling of hepatic cells exerts pressure on the intrahepatic ducts, and, following the development of intrabiliary obstructive jaundice, vitamin K is not absorbed from the bowel. Therapy with synthetic vitamin-K analogues or with natural vitamin K and bile-salts remedies this nutritional deficiency, but, because of a moderate metabolic disturbance in the production of prothrombin by the liver, although the restoration of the blood-prothrombin level is rapid it is not complete. The liver seems able to produce prothrombin, but in quantities insufficient to maintain a normal level in the blood. If chronic hepatitis develops subsequently, then these patients will show the same type of response as those in group 4 (see figure), but if clinical improvement occurs there will be a return of the blood prothrombin from a subnormal to a normal level (cf. group 3). In group 2 are found cases of catarrhal jaundice, toxic or infective hepatitis, cardiac failure with hepatosis, and also cases of so-called "fatty livers" which precede "alcoholic" cirrhosis.

A boy, suffering with acute rheumatic fever and severe congestive heart failure, developed an acute parenchymatous hepatosis, characterised by deep jaundice and considerable enlargement of the liver. He was very ill with cholæmia, and a severe hæmorrhagic diathesis became evident. On clinical and laboratory evidence his immediate prognosis was considered to be extremely grave. At the height of his illness his blood-prothrombin level was 20% of normal. After the injection of a synthetic vitamin-K analogue, the prothrombin concentration rapidly and unexpectedly increased to 45% of normal, well above the level for hæmorrhage. Despite further treatment, the prothrombin level continued to remain at between 45 and 50% of normal. At the present time, some nine months after the acute episode, the patient presents the picture of chronic hepatosis with ascites and dilated abdominal veins. The blood prothrombin has remained at the subnormal level.

GROUP 3

The blood-prothrombin level gradually rises with treatment, coincident with clinical improvement.—In this group of patients with liver disease, jaundice may or may not develop. Fever is usually present and may be associated with an acute septic process, involving especially the biliary tree. A moderately lowered blood prothrombin does not respond to therapy with vitamin K, or, if there is an immediate response, it is only slight. This is because in the majority of these patients there is no true lack of vitamin K in the diet, but the prothrombin level is low because the liver is apparently unable to utilise the vitamin K absorbed from the gut. If clinical improvement occurs, either through subsidence of an acute infectious process or because the initial liver disease clears up, then the prothrombin concentration in the blood will eventually reach a normal level. In this group are found patients suffering with infective cholangitis, catarrhal jaundice, acute and toxic hepatosis, patients undergoing heat therapy, and patients suffering with obstructive jaundice complicated by an associated infective process.

A housewife, aged 35, suffering with obstructive jaundice and hypoprothrombinæmia of 65% of normal, developed high fever, chills and liver tenderness suggestive of acute cholangitis. There was no response to what was considered adequate therapy with a synthetic vitamin-K analogue, but after spontaneous remission of the acute symptoms further treatment with similar amounts of the synthetic vitamin-K

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analogue restored her blood-prothrombin level to normal within two days.

A labourer, aged 55, was admitted with jaundice. Five days previously he had developed anorexia, nausea and vomiting and a moderate degree of fever, and since then his stools had become pale and his urine dark. His skin was a deep lemon-yellow. The liver was palpable 3 cm. below the costal margin, firm, smooth and not tender. The icteric index was 75. The stools were pale, and contained no blood. The urine contained bile and urobilinogen. A diagnosis of catarrhal jaundice was entertained. During his first week in the hospital there was some fever up to 102° F., while the icteric index fluctuated between 75 and 200. The blood-prothrombin level two weeks after the onset of illness was 65% of normal. Six days later the blood prothrombin had dropped to 45% of normal. He was given synthetic vitamin K intramuscularly, but the next day the blood prothrombin had dropped to 40% of normal. At this time the jaundice began to clear and there was obvious clinical improvement. However, there was no rapid response to repeated therapy with vitamin K, and the blood-prothrombin level rose gradually over a period of eight days, when it reached a normal level.

GROUP 4

The prothrombin level fluctuates at a subnormal level which is above the threshold for hæmorrhage, irrespective of therapy.—This group of patients have chronic and long-standing liver disease, usually unassociated with jaundice. The blood-prothrombin level usually fluctuates between 40 and 60% of normal and is not affected by therapy with natural or synthetic vitamin K, even when this is supplemented with a "high-vitamin" diet together with lightly broiled liver up to 300 g. per day and dried brewers' yeast concentrates by mouth (equivalent to 30 g. per day), and crude liver extracts given intramuscularly. In these patients there is no deficiency of vitamin K in the diet or evidence of its malabsorption from the gut, but the liver is not able to produce sufficient prothrombin to maintain a normal level in the blood (Kark and Souter 1940). Among these patients are found those suffering with cirrhosis of the liver and those presenting Banti's syndrome.

An unemployed man, aged 46, had been accustomed to take large quantities of alcohol for many years. During this time his diet had been inadequate. Dilated veins were present over the abdomen and there was severe bleeding from hæmorrhoids. Ascites and loss of weight were evident. He obviously had cirrhosis of the liver. While he was in hospital the blood-prothrombin concentration fluctuated between 44 and 70% of normal. This fluctuation was irrespective of therapy with vitamin K by mouth or parenterally in addition to 200 g. of liver and 90 g. of dried brewers' yeast by mouth. There was no response to the daily injection of 5 c.cm. of crude liver extract (1 unit U.S.P. per 2 c.cm.) or nicotinic acid, 500 mg., given by mouth or parenterally.

GROUP 5

The lowered blood-prothrombin level drops despite therapy or remains below the level for hæmorrhage.—This group of patients have severe and widespread liver damage. Clinically they appear acutely ill and usually present hæmorrhagic manifestations—bleeding from the mouth, gums or nose, with cutaneous bruising. The blood-prothrombin concentration is in the "hæmorrhagic zone" and often continues to drop despite therapy. The liver seems incapable of producing prothrombin, since it is apparently severely damaged. The immediate prognosis is grave. Autopsy will reveal an acute hepatitis (acute yellow atrophy) or generalised malignant infiltration of the liver.

A male elevator operator,* aged 59, was admitted to Evans Memorial Hospital complaining of weakness and jaundice. After an acute respiratory infection four weeks before admission he lost his appetite, developed a brassy taste in his mouth and his urine became dark. There was no history of alcoholism or of taking drugs. He was deeply jaundiced, his liver enlarged, firm, smooth and tender, and his spleen palpable at the costal margin. The blood-prothrombin concentration was 29% of normal on the day of admission, and during the six days he was in the hospital the level dropped despite therapy. On the day of his death it had fallen to 5–10% of normal. Autopsy confirmed the clinical diagnosis of acute atrophy of the liver.

* We wish to thank Dr. Chester Keefer for permission to publish this case-report.

DISCUSSION

Wilson (1939), from a study of a group of patients with liver disease, in which he compared hippuric-acid excretion and plasma-prothrombin level, concluded that the blood-prothrombin level was as sensitive in the diagnosis of liver dysfunction as tests of hippuric-acid excretion. He found, however, no correlation between the blood-prothrombin levels and the blood-fibrinogen or the bromsulphalein and galactose-tolerance liver tests. In a comparative group of cases reported elsewhere (Kark et al. 1941) no correlation was observed between the blood-prothrombin level and single observations of hippuric-acid excretion in patients with liver disease, after correction by therapy of any coexisting deficiency of vitamin K.

In a report on 12 patients with hypoprothrombinæmia and hepatic disease (Kark and Souter 1940) it was pointed out that they did not respond to therapy with natural vitamin K or synthetic vitamin-K analogues. At that time it was suggested that this failure of response might have prognostic importance when considered along with the level at which the blood-prothrombin concentration was maintained in these patients. It also appears that the repeated observation of the blood-prothrombin level before and after therapy with vitamin K may give information of value in the differential diagnosis of intense jaundice when the results of other tests are equivocal (group 1). For example, if a patient with intense jaundice and well-marked hypoprothrombinæmia responds rapidly (within 48 hours) and completely (blood-prothrombin level returns to 90–100% normal), then the diagnosis is probably obstructive jaundice. On the other hand, if there is a well-marked hypoprothrombinæmia which does not respond to therapy with vitamin K, and especially if the blood-prothrombin level continues to drop after therapy (group 5), the immediate outlook for recovery is extremely poor. Conversely, if there is a response to therapy in an acutely ill patient with liver disease and hæmorrhagic hypoprothrombinæmia (cf. case 2, group 3), the immediate prognosis is not grave.

The extent of liver damage in the other three groups of patients can be told only after a longer period. Furthermore, single estimations of blood-prothrombin level are not likely accurately to assess the extent of the liver dysfunction which is present.

If any of the patients in groups 2, 3 or 4 require a surgical operation, either on the biliary tract or elsewhere, it is always necessary to restore their blood-prothrombin to a normal level and to maintain it there by pre- and post-operative transfusions of fresh blood or fresh plasma. The bleeding occasioned by surgical procedures on these patients may, by reason of prothrombin depletion, reduce an already low blood-prothrombin concentration to a dangerous level. If hæmorrhagic hypoprothrombinæmia develops in these patients they may bleed to death, since in such cases the loss of prothrombin by bleeding and the inability of the liver to produce sufficient prothrombin to make good this loss will perpetuate the hæmorrhagic state.

CONCLUSIONS

In patients with clinically evident liver disease five types of response to vitamin-K therapy have been observed.

In cases with intense jaundice in which the diagnosis is in doubt the rapid and complete return of a lowered blood-prothrombin level to normal after vitamin-K therapy favours a diagnosis of obstructive jaundice.

In cases of gross liver disease the failure of response to vitamin K, when the blood-prothrombin concentration is below 30–35% of normal, is indicative of advanced hepatic failure and is a grave prognostic sign.

In other types of cases with liver disease which respond incompletely or not at all to vitamin K, transfusion of fresh blood or fresh plasma is the only known therapeutic measure which can then increase the prothrombin concentration of the blood. In these cases this therapeutic measure should be employed, before and after operation, if any surgical procedure is necessary.

We wish to thank Dr. George R. Minot and Dr. William T. Salter for their criticism and advice.

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PRESERVATION OF LIQUID COMPLEMENT SERUM

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A PROPER technique for Wassermann tests should require that the pooled serum from at least three properly fed, healthy, adult male guineapigs is used as complement (Wyler 1929, Faber and Black 1938a, Eagle 1939, Kolmer 1939).) Any less exacting standard may lead to error. Yet in war-time the weekly loss of three prime animals, if the serum is obtained by bleeding out, is an unwelcome extravagance. Even if the serum is obtained by heart puncture as little demand as possible should be made on the animals. In these circumstances, a simple means of preserving complement serum in the ordinary laboratory will be of much value.

The most effective method known is to preserve the serum by drying it from the frozen state, provided that the drying is complete and the dried material is kept dry (Flosdorf et al. 1935, 1940, Greaves and Adair 1936, 1939). Yet the fact that success depends on the skill applied to a slightly involved technique makes the method less attractive to the ordinary worker. Moreover, complement reconstituted from the dried material is even less stable than is fresh complement (Faber and Black 1938b). It can only be made up and kept satisfactorily if special preserving solutions such as those discussed below are used. The purpose of this note is to outline some factors involved in preserving liquid complement, to discuss some recognised methods of preservation, and to describe some effective new methods.

FACTORS CONTRIBUTING TO PRESERVATION

An inclusive explanation of factors involved in preserving liquid complement must take account of many seemingly unrelated facts. Possibly the most puzzling of these has been the divergent results given by the same method of preservation on different occasions, or in the hands of different workers.

The most popular method of preservation has been to freeze the serum solid in a freezing chamber or freezing mixture. Methods for more moderate temperatures (0°–3° C.) have been based on storing under carbon dioxide, or on the addition of hypertonic salt solution to the serum, a method which has been effectively modified by adding boric acid as well, presumably as a disinfectant. Another modification depends on storing the salted serum in sealed containers (Glover 1933, Green 1938). Most workers have found that serum intended for preservation should be processed promptly, and Glover suggests that the value of sealing may be that it retains carbon dioxide in the serum. The serviceableness of the various methods has been reviewed and examined by Kolmer and his colleagues (1919) and by Faber and Black (1938b).

Present work has shown that four factors are especially important in preserving liquid complement at room temperature or at 0°–3° C.: sterility, hypertonicity, pH and absence of specific destructive effects. The chief shortcoming of previous methods has been an imperfect combination of these factors, especially with reference to pH. The optimum pH for preservation at 0°–3° C. is about 6·4 (as shown roughly by indicators), or at room temperature 6, and the optimum zone is a sharp one. The stability of complement rapidly declines above pH 7. The variability of results with the same preserving technique may often express nothing more than a variable approach to the correct pH. Sterile hypertonic complement serum should have a life of many months at 0°–3° C. or room temperature, if the pH is correctly adjusted. Consequences of these facts may be recognised from everyday experience:

(*a*) Serum exposed to the air loses CO_2 erratically (the rate depending on such circumstances as warmth and shaking) and suffers an erratic alkaline drift towards pH 8; loss of activity in such serum will thus be erratic as well as rapid.

(*b*) Loss of CO_2 can be retarded by low temperatures, especially by freezing solid, and can be stopped by sealing in tubes; these procedures help to preserve fresh serum, but not serum which has already lost its CO_2.

(*c*) Loss of CO_2 is accelerated by evacuation; vacuum-dried serum will be especially unstable on reconstitution.

(*d*) Loss of CO_2 can be reversed by storing under CO_2; alternatively, its destructive consequences can be avoided by replacing it with a non-volatile acid of suitable strength (pK 6–6·5);* these are suitable conditions for preserving complement.

(*e*) The rôle of boric acid is apparently complex since its acid strength (pK 9·2) is insufficient to permit it to replace CO_2 (pK 6·1); its main effect is probably due to polymerisation to a more acid polymer (Thygesen 1938). Significant amounts of polymer are found only in concentrated solution, and this accords with the fact that only concentrated solutions are used for preserving serum (0·4–0·6 M). A secondary and variable effect may follow from the formation of acidic complexes with sugar alcohols or sugars. Mannitol, for instance, strongly enhances the acidity of boric acid (Bell et al. 1938), is widely distributed in plants, and is not easily metabolised after ingestion (Carr and Krantz 1938). Its presence in serum will vary with the quantity and type of diet, and thus the effect on the pH of boric-acid serum will be variable. Comparable effects will follow from the presence of other sugar alcohols. The variable success of the boric-acid method in different laboratories can thus be accounted for.

SELECTION OF PRESERVING AGENTS

The choice of reagents to control sterility, hypertonicity, and pH is much restricted by specific destructive effects.

Sterility.—For various reasons few of the usual disinfectants can be used to control infection in complement serum. Strong oxidising agents destroy complement (Ecker et al. 1938), and highly coloured disinfectants are inconvenient. Heavy metal salts, formaldehyde, and several phenols (trichlorophenol, 8-hydroxyquinoline, and sodium salicylate) were found to inactivate complement on prolonged exposure. Merthiolate, phenyl mercuric nitrate, and boric acid were hæmolytic. Sulphides, cyanides, and acid gases like sulphur dioxide would cause undesirable pH changes. Thus only proflavines, sodium selenite and sodium azide were left for trial. Azides resemble sulphides and cyanides in inhibiting cellular respiration (Keilin 1936), and the sodium salt in a strength of 0·01–0·05% will selectively inhibit a variety of aerobes growing on blood-agar plates (Snyder and Lichstein 1940). In this laboratory we have found it a better disinfectant for serum than selenite or proflavine at doses innocuous to complement.

Sodium azide (NaN_3) is important as a disinfectant for serological uses because: (*a*) it is neither hæmolytic nor destructive of complement at dilutions necessary to prevent visible infection of serum (M/80 = 0·08%); (*b*) it is chemically inert towards organic molecules of serological interest, and is stable in solution at neutral pH (only on substantial acidification is the poisonous hydrazoic acid set free, pK 4·5); (*c*) it is effective in considerable dilution and has ionic properties resembling sodium chloride—notable considerations in dealing with colloids. These distinctive advantages are unfortunately offset by its toxicity; it is a powerful poison with effects resembling those due to cyanide (Smith and Wolf 1904). The dangerous dose is only 5–10 mg. (Kayser 1928), and this is present in only 0·6–1·2 ml. of the stock solutions described below (M/8). Obviously such solutions should not be handled by unskilled persons. It may also be noted that the azides of heavy metals are detonators; though sodium azide is stable in solid form, it is probably best handled with non-metallic spatulas.

Hypertonicity.—Many salts have been recommended for increasing the tonicity of serum for preservation, but they have hitherto been studied without adequate control of pH; conflicting reports have been common (Faber

* In this note, pK is taken to mean the negative logarithm of the titration constant of the acid at an ionic strength equivalent to that of physiological saline.

DRS. KARK AND SOUTER: REFERENCES

Andrus, W. D., Lofd, J. W. and Moore, R. A. (1939) *Surgery*, **6**, 899.
Butt, H. R., Snell, A. M. and Osterberg, A. E. (1939) *J. Amer. med. Ass.* **113**, 383.
Kark, R. and Souter, A. W. (1940) *Lancet*, **1**, 1149.
— White, F. W., Souter and Deutsch, E. (1941) *Proc. Soc. exp. Biol. N.Y.* **46**, 424.
Scanlon, G. H., Brinkhous, K. M., Warner, E. D., Smith, H. P. and Flynn, J. E. (1939) *J. Amer. med. Ass.* **112**, 1898.
Smith, Warner and Brinkhous (1937) *J. exp. Med.* **66**, 801.
Warren, R. and Rhoads, J. E. (1939) *Amer. J. med. Sci.* **198**, 193.
Wilson, S. J. (1939) *Proc. Soc. exp. Biol. N.Y.* **41**, 589.

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and Black 1938b). Work in this laboratory has not yet proceeded far, but it suggests that sodium salts of monovalent ions—e.g., chloride—are more satisfactory than those of divalent ions of the dehydrating type—e.g., sulphate, phosphate. Since sodium chloride is the recognised diluent for serological work, it should be preferred for salting the complement, at least until strong reasons appear for using another salt. The practicable hypertonicity will be simply that which can give, after dilution with water to the dose required for the test, a correctly isotonic solution.

The pH.—Most buffer mixtures which cover the pH region 6–7 include salts with divalent ions. Preliminary work with phosphate buffers showed that such divalent salts give inferior results if used both to make the serum hypertonic and to control pH. The best results followed from the lowest possible concentrations, tonicity being controlled by other means—e.g., by adding sodium chloride.

In experiments along these lines, buffer acids with pK values between 6 and 7 were chosen, and sufficient amounts added to samples of serum to bring the pH to about 6–6·2 (shown roughly by sulphonphthalein indicators). The samples were finally made up as 1 in 2 serum dilutions containing M/80 azide and sufficient sodium chloride to be 5 times isotonic and left at room temperature (15°–20° C.) in loosely stoppered tubes. The control sample with only azide present became completely inactive within a fortnight, and the 5 × isotonic control without pH adjustment was inactive after five weeks. Of the other samples, those adjusted to the above pH with M/50 NaH maleate (pK 6), M/40 cacodylic acid (pK 6·1), saturated CO_2 gas (pK 6·1), M/33 NaH glycerophosphate (pK 6·3), or M/25 NaH_2 phosphate (pK 6·6) have suffered no important change in titre in ten weeks. Samples adjusted with hydrochloric acid were less satisfactory, while those with M/20 NaH sulphite (pK 6·7) were inactive in eighteen hours. The phenomenal keeping power of salted complement adjusted to the proper pH with selected buffers has been confirmed on many occasions.

PRESERVED COMPLEMENT IN THE WASSERMANN REACTION

The serviceability of the various mixtures for use in Wassermann tests by the Harrison-Wyler method (Wyler 1929) and by the recent modification of it (Richardson 1940) has been regularly under study.

Complement preserved in acidified mixtures as above was found to be entirely satisfactory for tests by the Richardson modification, and for most tests by the Harrison-Wyler method. Occasionally, however, a non-syphilitic serum would be found in which a tendency to give a doubtful reaction by the Harrison-Wyler method, using fresh complement, would be much accentuated by the acidified complement; the implications of this are being explored. In the meantime it was thought that complement at the optimum pH for preservation ought not to be used directly for Wassermann tests. An attempt to compromise between this pH and a safe pH for tests was made in early work. It was found that complement treated with M/80 azide and M/8 phosphate of pH about 7 could be transmitted by post and still remain satisfactory in tests. This important conclusion was confirmed by three pathologists—Dr. J. L. Edwards, Major K. E. A. Hughes, and Dr. Robert Thomson, to whom I am grateful for collaboration. Nevertheless the stability of the product was not optimal, and attempts were next made to store the complement at its optimum pH but under such conditions that the pH automatically returned to less acid values merely on dilution. This is the great advantage of the boric-acid method, since the polymer to which acidity is due practically disappears on dilution; but the method has the accompanying disadvantages of a variable pH during preservation, as already discussed, and of high concentrations of non-biological material. These faults are remedied in the methods described below.

DETAILS OF METHODS

Four solutions—A, B, and C for method 1, and C and D for method 2—are used.

A. (*M/4 boric acid in saturated NaCl*).—Boric acid (H_3BO_3), 1·55 g., is dissolved in and made to 100 ml. with saturated NaCl solution.

B. (*M/2 sorbitol, M/8 azide in saturated NaCl*).—Sorbitol ($C_6H_{14}O_6.\frac{1}{2}H_2O$), 9·55 g., and sodium azide (NaN_3), 0·81 g., are made to 100 ml. as above. The very poisonous nature of sodium azide has been discussed.

C. (*M/8 azide in saturated NaCl*).—Sodium azide, 0·81 g., is made to 100 ml. as above.

D. (*Saturated NaCl*).—A saturated solution of sodium chloride in water.

In making solutions B and C, some NaCl may be precipitated. It is assumed, however, that the final solutions have the same tonicity as saturated NaCl (5·4 M = about 36 × isotonic). Moderate change of temperature has little effect on the solubility of NaCl.

Method 1.—Eight volumes of serum are mixed with one volume of solution A and one volume of a mixture of B and C. The suitable ratio of B to C may vary according to the source of the complement, but is likely to be about 1 : 1 (perhaps greater). The pH of the serum mixture should be about 6–6·5, as shown by a faint or negligible green tinge with bromothymol blue indicator and a distinct purple with bromocresol purple, while experience will show what conditions best suit the temperature chosen for preservation. In the examples given, a 4 in 5 dilution of serum containing M/40 boric acid, M/40 sorbitol, M/80 azide, and 1·08 M NaCl will be obtained. The tonicity will be 0·8 × isotonic with respect to serum and 7·2 × isotonic with respect to NaCl, or 8 × isotonic altogether. The method depends on the ability of boric acid and sorbitol to form an acidic complex whose acidity can be increased with increase in the sorbitol ratio. On dilution, the complex largely dissociates and the acidity disappears. Similar use can be made of other polyhydric alcohols or sugars.

Method 2.—Eight volumes of serum are mixed with one volume of solution C and one of solution D. The mixture is then stored under an atmosphere of CO_2 in a closed container. On dilution and exposure to air the carbon dioxide disperses and the acidity disappears.

Mixtures made by either method are kept in the dark and may be used as 1 in 10 complement dilutions simply by mixing 1 volume with 7 volumes of distilled water.

The methods are satisfactory with stale serum, provided the titre has been maintained, and also, after appropriate changes, for reconstituting vacuum-dried serum. Method 1 is suited to laboratories doing routine testing and lacking facilities for a supply of CO_2. Method 2 is suited to research laboratories needing complement with negligible adulteration; the 1 in 10 dilution has only M/640 (0·01%) sodium azide as adulterant and this is a salt closely resembling sodium chloride in ionic properties.

SUMMARY

Successful preservation of the complement activity of hypertonic guineapig serum depends sharply on pH. Sterile salted serum keeps for months at room temperature if brought to about pH 6, or, at 0°–3° C., to about pH 6·4. Sodium azide is the disinfectant of choice. Methods are described for maintaining a suitably acid pH during storage, and restoring neutrality automatically on dilution. They depend on the use of sorbitol-boric-acid complexes, or of carbon dioxide.

I wish to thank the Dean of the London School of Hygiene and Tropical Medicine, and Prof. James McIntosh of the Bland-Sutton Institute of Pathology, Middlesex Hospital, for hospitality during the course of this work; and Colonel L. W. Harrison for his encouragement.

REFERENCES

Bell, F. K., Carr, C. J., Evans, W. E. and Krantz, J. C. jun. (1938) *J. Phys. Chem.* **42**, 507.
Carr, C. J. and Krantz, J. C. jun. (1938) *J. biol. Chem.* **124**, 221.
Eagle, H. (1939) *Ven. Dis. Inform.* Suppl. No. 9, p. 159.
Ecker, E. E., Pillemer, L., Martiensen, E. W. and Wertheimer, D. (1938) *J. biol. Chem.* **123**, 351.
Faber, J. E. and Black, L. A. (1938a) *J. Lab. clin. Med.* **23**, 496.
— — (1938b) *Ibid*, p. 961.
Flosdorf, E. W., Boerner, F., Lukens, M. and Ambler, T. S. (1940 *Amer. J. clin. Path.* **10**, 339.
— Mudd, S. (1935) *J. Immunol.* **29**, 389.
Glover, R. E. (1933) *Rep. Inst. Anim. Path. Univ. Camb.* **3**, 52.
Greaves, R. I. N. and Adair, M. E. (1936) *J. Hyg., Camb.* **36**, 507.
— — (1939) *Ibid*, **39**, 413.
Green, C. A. (1938) *J. Path. Bact.* **46**, 382.
Kayser, E. (1928) *Z. angew. Chem.* **41**, 49.
Keilin, D. (1936) *Proc. roy. Soc.* B. **121**, 165.
Kolmer, J. A., Matsunami, T., Trist, M. E. (1919) *Amer. J. Syph.* **3**, 513.
— (1939) *Ven. Dis. Inform.* Suppl. No. 9, p. 207.
Richardson, G. M. (1940) *Brit. J. vener Dis.* **16**, 166.
Smith, L. and Wolf, C. G. L. (1904) *J. med. Res.* **7**, 451.
Snyder, M. L. and Lichstein, H. C. (1940) *J. infect. Dis.* **67**, 113.
Thygesen, J. E. (1938) *Z. anorg. Chem.* **237**, 101.
Wyler, E. J. (1929) *Spec. Rep. Ser. Med. Res. Coun., Lond.* No. 129.

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MAMMARY CARCINOMA

RESPONSE TO IMPLANTATION OF MALE HORMONE AND PROGESTERONE

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A HIGH percentage of certain strains of mice die from cancer of the breast and some women seem to have an inherited susceptibility to the disease. Apart from inherited susceptibility, one of the carcinogenic factors which may transform a normal cell into a cancerous one is said to be a surplus of œstrogenic substances in the body. It appeared, therefore, worth while to try to counteract the female hormone by male hormone.

Lacassagne (1939), Raynaud (1939), Murlin (1939), and Nathanson and Andervont (1939) have published papers on the same subject, but they never used the implantation method—they made injections with male hormone. Sometimes they injected the mice at a very early age before they had litters (between the 1st and 21st day of life), and none of them treated the mice after the age of 4–4½ months. If a mouse is treated with male hormone soon after birth there is a risk that the mammary gland will be prevented from developing. Male hormone in big doses causes an atrophy of the mammary gland as well as of the ovaries, and the suppression of the ovarian function may also be secondary to pituitary inhibition. No details of the changes in the different glands can be described in this paper, but the results of a long-continued action of testosterone on these glands are well known.

All the observers mentioned showed that testosterone protects from cancer of the breast a high percentage of mice of the strain I used in my experiments. Murlin influenced the growth and metastasis of the transplanted Brown-Pearce epithelioma by urinary androgens and considerably reduced severe metastasis and mortality, especially when the injections were begun before the inoculation of the tumour. The workers quoted tried to counteract inherited susceptibility to cancer by injecting male hormone, and succeeded to some extent where they injected the mice at a very early age. But they undoubtedly altered the constitution of a female mouse if they injected the male hormone so early, and at the end of the course there was only a rudimentary mammary gland, or a gland which had never properly developed. It is not surprising therefore that these mice did not develop cancer of the breast, since the œstrogenic factor could not be formed while the ovaries remained atrophic; and these mice were never wholly female.

In the following experiments I used the implantation method in order to maintain a permanent source of counteracting hormone in the tissues. It is perhaps worth comparing the results in strains of mice with a very high familial incidence of breast cancer and those obtained in women suffering from breast cancer who had a high familial incidence of the disease. Unfortunately the number of animals and patients who were treated and observed over several years was small. The animal experiments took place between February, 1939, and September, 1940. The war prevented me from breeding further generations of mice. It was also difficult to keep track of the patients over a sufficiently long period. Many of the treated patients left London before my observations were concluded, and only a small number could therefore be used for the purpose of this inquiry.

MOUSE EXPERIMENTS

Mice of Strong A strain were used. They show a very high incidence of breast cancer, and according to Bittner (1939) up to 83% die from breast cancer when they are eleven months old and have had several litters. I had at my disposal 354 mice born in the laboratory, but only 65 were bred and used either for implantation or as controls. Out of these 65 mice, only 22 remained for investigation over a period of thirteen to sixteen months; 43 died from intercurrent disease or failed to have three litters.

Of the 22 remaining mice 10 (nos. 1–10) had testosterone propionate implanted and 12 (nos. 11–22) were controls. Each of them had three litters, the 10 treated mice having 165 offspring altogether, and the controls 189. Every three to five weeks 7–8 mg. of testosterone propionate was implanted subcutaneously in tablet form, being embedded in the subcutaneous fat of the back of mice nos. 1–10. After three or four weeks the small tablet was usually absorbed.

Of the 12 control mice 9 died from cancer of the breast (see table). They usually showed the first sign of cancer between the tenth and eleventh month and on an average it took a month from the beginning of the disease for them

RESULTS OF IMPLANTATION OF TESTOSTERONE PROPIONATE IN MEMBERS OF A STRAIN OF MICE SUSCEPTIBLE TO MAMMARY CANCER

TREATED MICE (Testosterone propionate 7–8 mg. in each implant)				CONTROL MICE	
No.	Age at first implant (months)	No. of implant	Result	No.	Result
1	4½	7	Living, 15 mths; no cancer	11	Died cancer, 12 mths.
2	5½	7	Living, 15 mths; no cancer	12	Died cancer, 13 mths.
3	6	7	Died cancer, 14 mths	13	Died cancer, 14 mths.
4	5½	7	Died, 14 mths; no cancer	14	Died cancer, 13 mths.
5	8	3	Died cancer, 10 mths.	15	Died cancer, 12 mths.
6	8	5	Living, 16 mths; no cancer	16	Living, 16 mths; no cancer
7	5½	4	Living, 15 mths; no cancer	17	Died cancer, 13 mths.
8	8½	5	Died cancer, 12 mths.	18	Died cancer, 12 mths.
9	8	4	Living, 15 mths; no cancer.	19	Living, 15 mths; no cancer,
10	9	4	Died cancer, 13 mths.	20	Died, 10 mths; no cancer
				21	Died cancer, 12 mths.
				22	Died cancer, 12 mths.

to die. Mouse no. 20 died at 10 months of intercurrent disease. Of the 10 implanted mice 4 died from cancer. Mouse no. 4 had no cancer when it died from an intercurrent disease at fourteen months. It was found that none of the mice who lived for more than fifteen or sixteen months died from cancer. All the mice of this strain which had no cancer by the age of twelve or thirteen months died from some other cause, the age at death being between sixteen and eighteen months. Altogether 5 of the treated mice and 2 of the controls survived; 4 of the treated mice and 9 of the controls died of cancer; 1 treated mouse and 1 control died from other causes.

If we compare the 5 mice who did not develop cancer after the implantation with the 4 mice who did so in spite of implantation, we find that 3 of the former had received implants before the age of six months, whereas all the latter received implants at six months or even later. The younger a mouse the more implants can be made; thus the young mice received 7 implants. The fewer the implants the more limited the chance of protection. In some of the mice who developed cancer fresh implants were made even after the first appearance of the growth, but no beneficial effect could then be observed. Histological examination of the tumours revealed no difference in the treated and control cancerous mice.

I made no implantations until the mice had had three litters, when forced breeding had produced œstrogenic substances without interruption for at least the first four and a half months of their lives. Thus not only was the hereditary factor acting but a surplus of œstrogenic substances had also stimulated the breast. Of the 4 mice which were implanted before the first half of their precancerous life was over, 3 appeared to be protected from cancer for fifteen months and more; whereas of 6 mice implanted nearer to the date when breast cancer in this strain usually appeared, 4 were not protected.

CLINICAL TRIALS IN WOMEN

The mamma is an organ in which there is a high familial incidence of cancer, often restricted to the immediate female relatives of the woman suffering from breast cancer, as the statistical investigations of Wassink (1936) in Holland and of Waaler in Norway have shown. I

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traced back the history of my patients and found that in 6 breast cancer ran in the family. All 6 patients had undergone operations for breast cancer and after the operation had had X-ray treatment by experts. Male hormone was given to these patients to see whether when given over a long period it would inhibit severe metastasis and influence recurrences. Naturally no prophylactic treatment could be applied before the first appearance of cancer, as can be done in mice—membership of a family in which cancer runs is no indication for prophylactic treatment. Thus treatment could be started only when the normal mammary cells had already undergone cancerous change. In 3 of the 6 there were no signs or symptoms of recurrence when male hormone was implanted; in the other 3 metastases were present at that time. Of the following cases 4 have already been published in part (Loeser 1939, 1940).

CASE 1.—Married woman, aged 37; no children. Maternal aunt died from breast tumour. Radical operation in Johannesburg in June, 1936, after X-ray treatment. Recurrence above right clavicle in February, 1937. Histological examination revealed carcinoma. I performed curettage in April, 1937, because of uterine hæmorrhage; hyperproliferation of the endometrium found. During May–September, 1937, patient had testosterone propionate, 1500 mg., injected, resulting in amenorrhœa. In December, 1937, testosterone propionate, 600 mg., was injected. Symptoms of masculinisation appeared—enlargement of clitoris, hoarse voice, increased sexual urge, increased growth of hair, gain in weight. These symptoms faded in June, 1938. In March, 1939, September, 1939, and March, 1940 testosterone propionate, 600 mg., was implanted again with the same result. In November, 1940, the patient was free from symptoms or signs of cancer. The voice remains hoarse.

CASE 2.—Married woman, aged 42; two healthy children, one miscarriage. Paternal uncle died from cancer; grandmother died from breast tumour. Radical removal of breast performed September, 1935, after X-ray treatment. Recurrence in cicatrix on the left breast, March, 1936; excision. Second recurrence in armpit, October, 1936; histological examination confirmed carcinoma. Curettage performed because of uterine hæmorrhages; hypertrophic endometrium found. Between April, 1937, and January, 1938, testosterone propionate, 700 mg., injected. December, 1938 to March, 1939, testosterone propionate, 600 mg., injected. In November, 1939, and June, 1940, implantations of testosterone propionate, 600 mg., were made. Signs of masculinisation followed as in case 1. In October, 1940, there were no signs or symptoms of cancer recurrence.

CASE 3.—Spinster, aged 41. Mother died from breast tumour, illness lasting four years. Radical operation on patient's right breast in Budapest in 1936, after three courses of X-ray treatment. Supraclavicular recurrence in 1938, treated by X rays. In June, 1938, patient consulted me because of pruritus vulvæ. At that time she had no recurrence of breast cancer. Between June and October, 1938, testosterone propionate, 700 mg., injected. In January, 1939, testosterone propionate, 500 mg., implanted; implantation repeated in June, 1939. Masculinisation as in the other cases. In December, 1940, there were no signs or symptoms of cancer.

CASE 4.—Married woman, aged 60; two children. One sister had breast cancer. For the past eight years patient had been treated with radium for carcinoma of the breast. Multiple recurrences were treated by excision. Metastases on both sides, supraclavicular and mediastinal. Diffuse infiltration in right axilla with a suppurating ulcer the size of half a crown around the nipple. The radiologist called in recommended morphine for pain; on account of the disseminated carcinosis no other treatment was carried out. From July to October, 1939, testosterone propionate, 1850 mg. was implanted. The temporary result was a superficial swelling around the right nipple, accompanied by considerable reduction of the ulcer, softening of the hard infiltration in the armpit, and superficial swelling and pigmentation of the healthy breast. Striking features were an increase in weight by 5 lb. and obviously improved health; the pain along the right arm lessened considerably; the patient felt very well, walked about and looked after her household, whereas previously she had been confined to bed. The improvement lasted only four months. A new implantation could not be performed owing to lack of material. The patient's weight dropped again and further decline could not be checked.

CASE 5.—Married woman, aged 45 years; no children. Sister had had breast cancer, and a nephew at the age of 18 was suffering from cancer of the testis and had recently been operated on. Radical operation for cancer of the breast on the right side 1937, followed by much X-ray treatment in the next year. She had two recurrences in the operation scar and a fresh recurrence in the axilla in July, 1939. From August to November, 1939, testosterone, 1500 mg., was implanted. At first patient showed similar striking symptoms of improvement to those in case 4, but there was no change in the consistency or size of the recurring tumour in the axilla, though it showed no enlargement; X-ray treatment dissipated this little tumour. New recurrence in the armpit and left breast in April, 1940. As the patient had undergone temporary masculinisation after the implantation of testosterone, a trial was made of progesterone. In July, 1940, progesterone, 300 mg., was implanted and daily doses of progesteral, 40 mg., by mouth were given up to a total of 2800 mg. Menstruation stopped. No result was obtained; metastasis in the liver with ascites was diagnosed.

CASE 6.—Married woman, aged 28; no children. Paternal aunt died from breast tumour. Two years ago operation was performed followed by X-ray treatment because of breast cancer. She had metastases in the mediastinum, with hoarseness. Supraclavicular glands involved on both sides. Radiologist refused further X-ray treatment. Progesterone, 400 mg., implanted in August, 1940, and for two months daily doses of progesteral, 40 mg., taken by mouth. There was no change in her condition. She had amenorrhœa for approximately a year, and after the implantation amenorrhœa continued. No improvement, further decline and death in November, 1940. The total amount of progesteral taken was 2400 mg.

Cases 1, 2 and 3 had one common feature: soon after radical operation and X-ray treatment they all developed recurrences; when treatment with male hormone was begun these were not present, for they had either been excised or had disappeared after X-ray treatment. Clinically these patients were free from any sign of cancer when the injections or implantations of male hormone were begun. But although they had shown recurrences soon after operation they remained free from recurrences and metastases for 3–4 years (cases 1 and 2) and 2½ years (case 3) after the hormone treatment. It is now nearly five years since the operations were performed on all these patients and they are still in good health. These patients will have to be observed for several more years before any final judgment can be reached, and it will be necessary to continue hormone treatment from time to time. Even then it will be difficult to assume that the male hormone is responsible for the good result and the postponement of recurrences.

Cases 4, 5 and 6 all had metastases at the time when hormone treatment was begun. Cases 4 and 5 improved strikingly under implantation treatment for the first two or three months, but the cancer itself remained unaltered and their decline could not be averted.

DISCUSSION

There is a wide difference between inherited breast cancer in mice and carcinoma of the breast in women. Virgin or castrated female mice of strains with high incidence of breast cancer seldom suffer from cancer of the breast. Virgin or unmarried women acquire breast cancer more often than married women who have had children (Peller 1940). In my experiments the mice as well as the women showed an inherited susceptibility to breast cancer. This susceptibility was further enhanced in the mice by œstrogenic substances developed in response to forced breeding as a result of which the mammary gland was exposed without interruption to hormonal irritation. The same cannot be said of the patients; 4 of them had never had a child, and there is no reason to assume that their mammary glands had been exposed to any irritation by œstrogenic substances. Whether they produced abnormally high amounts of these substances in their tissues cannot be said. But the antagonist of œstrogens was introduced into their circulation, and it is my impression that it was not the antagonistic action alone but the alteration in the patient's constitution—the masculinisation—which had an effect. The crescendo of masculinisation coincided with improvement in their condition; the diminuendo with progress of the disease.

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Progesterone can also be regarded as antagonistic to the follicular hormone. In my cases no effect of progesterone on the cancer cells was observed. Progesterone acts quicker when given by mouth than when implanted, and as it was only applied in hopeless cases no definite conclusions should be drawn; but it might be worth trying it in still more massive doses in cases which—like my cases 1, 2 and 3—are free from cancer at the time of treatment.

Incomplete as this series is, I hope it may encourage others to try out the idea and perhaps to implant testosterone or progesterone in cases of breast cancer at the time when the radical operation is performed. It may be implanted in the tissues of the operated breast whether postoperative X-ray treatment is given or not, and the implant should be repeated as soon as the signs of masculinisation disappear. The effect of testosterone is always temporary, and may be compared with a temporary sterilisation, which in contrast to X rays acts on every tissue of the cancerous body instead of locally. I suggest that testosterone propionate, 700 mg., should be injected over two months. I have called this the hormone atrophy dose (H.A.D.) for the endometrium, since it temporarily sterilises any healthy woman and makes the endometrium atrophic (Loeser 1940). It is better to implant testosterone propionate, 500 mg., than to inject 700 mg., since the implant has a more lasting effect.

SUMMARY

On the assumption that excess of œstrogenic substance is a factor in producing cancer of the breast, an attempt was made to counteract this effect by implanting male hormone.

In mice of a strain showing a very high incidence of breast cancer testosterone propionate was implanted subcutaneously in 10 every three to five weeks while 12 acted as controls. Implantation was not begun until the mice had had three litters. In the treated group 4 and in the controls group 9 died of cancer.

In 6 women with a family history of breast cancer who had had their breasts amputated for carcinoma, testosterone propionate or progesterone or both were repeatedly implanted and in 2 progesteral was also given by mouth. In 3, recurrences were present at the time of implantation, and though 2 of these improved temporarily in general health, the progress of the cancer was not checked. In 3 no recurrences or metastases were present at the time of implantation, and none has appeared in the subsequent five years.

It is suggested that male hormone should be implanted in the operation site when the breast is removed for carcinoma, and implantation should be repeated when signs of masculinisation disappear.

I wish to thank Prof. J. B. S. Haldane for allowing me to work in the Department of Biometry at University College, London; Dr. H. Grüneberg and Dr. P. A. Gorer for giving me advice on breeding mice; Miss M. Watson my assistant; and the Schering Corporation of New York and Organon Laboratories for supplying testosterone and progesterone tablets.

REFERENCES

Bittner, J. A. (1939) *Publ. Hlth Rep., Wash.* **54**, 380, 1113.
Lacassagne, A. (1939) *Bull. Cancer*, **28**, 951.
— Raynaud, A. (1939) *C.R. Soc. Biol. Paris*, **131**, 568.
Loeser, A. (1939) *C.R. Soc. franç. Gynéc.* **9**, 77.
— (1940) *Brit. med. J.* **1**, 479.
Murlin, J. R. (1939) *Arch. Pathol.* **28**, 777.
Nathanson, I. T. and Andervont, H. B. (1939) *Proc. Soc. exp. Biol., N.Y.*, **40**, 421.
Peller, S. (1940) *Surg. Gynec. Obstet.* **71**, 1.
Wassink, W. F. (1936) *Int. Cancer Congr.* p. 171.

Reviews of Books

Lipidoses: Diseases of the Cellular Lipid Metabolism

SIEGFRIED T. THANNHAUSER, M.D., Ph.D., formerly professor of medicine, University Clinic, Freiburg; associate professor of medicine, Tufts College medical school. London: Humphrey Milford, Oxford University Press. Pp. 370. 30*s*.

MOST of our knowledge of this group of metabolic disorders has accumulated during the last twenty years, a period covered by Professor Thannhauser's contribution of the section on lipoid diseases to the "Oxford Loose-Leaf Medicine." The publication in book form of this monograph by one who has contributed so much to this particular branch of medicine will be welcomed by all interested in the lipoidoses. The volume, which is well edited by Prof. H. A. Christian of Harvard, is abundantly illustrated and embodies full records of cases observed by the author. Appropriately enough, the section on xanthomatosis occupies most of the book; it embraces 12 primary types divided into hypercholesterœmic and normocholesterœmic groups, and 8 other types. Gaucher's disease and Niemann-Pick's disease are fully considered in separate sections.

The author has no doubt that the primary lipoidoses are manifestations of abnormal intracellular metabolism in the reticular and histiocytic cells of the organism, supporting this concept with convincing biochemical and experimental evidence. He regards an imbalance of intracellular lipoidases as the fundamental disturbance. The research worker will reap a rich harvest from the 1076 references which are conveniently arranged at the end of each section.

Parenthood: Design or Accident?

(4th ed.) MICHAEL FIELDING. London: Williams and Norgate. Pp. 259. 2*s*. 6*d*.

THIS excellent little book on birth control and related problems needs no introduction either to the medical profession or to the public. In this edition recent research work on spermicides is included; the description of the technique of well-established and desirable methods has been rewritten in the light of modern experience; dangerous, ineffective, emergency and experimental methods are fully discussed; so also is the safe period. It would be difficult to find a more lucid and concise description, or a more helpful evaluation, of this much publicised method of family limitation. The sections on the sociological, ethical and legal aspects of contraception remain materially unchanged. The appendices include lists of birth-control clinics in the United Kingdom and of approved and reputable appliances and chemicals. There is also a short bibliography, glossary and index.

Arthritis and Allied Conditions

(2nd ed.) BERNARD I. COMROE, M.D., F.A.C.P. London: Henry Kimpton. Pp. 878. 42*s*.

THIS is a large book but not too large, for arthritis and various conditions loosely termed rheumatic occupy a considerable part of medical practice here as well as in Philadelphia. In fact Dr. Comroe often compresses the result of much study (there are references to over two thousand original papers) into a small space. General practitioners, as well as physicians especially interested in chronic rheumatism, will find much to interest them and to help them in their choice of therapy, though they will probably use the book more for reference than for light reading on dark evenings. The illustrations are good and more profuse than in the first edition, while new chapters have been added and many old ones rewritten. Curiously, the paging of the sections of each chapter is given in the table of contents, not the paging of the chapters themselves; but the index is full.

Out of the Test Tube

(3rd ed.) HARRY N. HOLMES, Ph.D. New York: Emerson Books Inc. Pp. 305. $3.

FEW of us without special knowledge of the subject ever pause to consider the material benefits conferred by chemistry upon mankind. In his expanded and revised edition Dr. Holmes gives a vigorous account of what the chemist, working in divers spheres, has done, is doing and will do for us. Our food, tools and clothing, our medicines, means of transport and weapons of war are only a few of the accepted accompaniments of modern life which are profoundly influenced by chemistry. It is depressing to reflect on how high explosive has been largely diverted from its proper purpose of quarrying rock and so liberating slave-labour; or to realise that profit-making rather than philanthropy has been a prime motive of chemical research. But we shall change all that in the brave new world after the war.

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THE LANCET
LONDON: SATURDAY, DECEMBER 6, 1941

EGG OR SCORPION?

EARLY in 1939 Sir ARNOLD WILSON and Prof. HERMANN LEVY published their first volume on our law of workmen's compensation, surveying the historical origins, Parliamentary debates and departmental inquiries. The war, which has broken their admirable partnership and delayed their second volume, now published,[1] must not be pleaded as an excuse for deferring study of their conclusions on the admitted need of reform. War means extended hours in factories, a quickened industrial tempo, more fatigue, less experienced workers (some of them long unemployed), new machinery, processes and materials involving unknown risks of accident and injury. These conditions are in part familiar in times of prosperity; war adds personal anxieties, air-raid dangers and the inconvenience of the blackout.

After leading them in industry, Britain has lagged behind other countries in her scheme of industrial compensation. Distrusting bureaucracy, we have refused to contemplate large-scale official administration. We leave this great social activity to the private enterprise of the insurance companies and to the judicial impartiality of the county courts. The courts are swift and their proceedings are reported, but there is a lack of uniformity; a settlement passed by the judge or registrar of one court would be rejected, it is said, by that of another. Hence the demand for a Workmen's Compensation Commissioner. Afraid of interfering with the individual control of business, we have not even insisted upon compulsory insurance of employers (except in mining), though we now insist upon it for motorists. We hesitate to create a "State monopoly" of occupational insurance because it would be so costly; yet an insurance company pays out only 60 per cent. of its earned premiums in awards to incapacitated workmen, about 9 per cent. being consumed in commissions and 32 per cent. in management expenses. What would we say if a banker, taking our money on deposit, informed us that about 40 per cent. of it would be absorbed by expenses? The companies do not concern themselves with accident prevention. The insured employer has no incentive to diminish the risks. The standard of safety is said to be highest in those great undertakings which carry their own insurance.

Hesitating to fetter freedom of contract, we have left the law too loose. The all too attractive bait of the lump-sum agreement is dangled. It looks like a nest-egg, but has a sting in its tail. The injured man, be it recalled, can choose between three legal remedies. First comes the common-law claim for damages, based on some breach of duty on the employer's part and complicated by the defence of "common employment" which eminent judges have called fantastic. Next comes the Employer's Liability Act with its own special technicalities, seldom used but still to be considered. Lastly the Workmen's Compensation Act imposes liability irrespective of negligence by either side. Its sweeping provisions were meant to simplify awards, but the notorious words "accident arising out of and in the course of the employment" have multiplied the litigation which the statute was to avert. Faced with the choice of remedy, the workman may have no trade-union to advise him. The insurance company will naturally seek a settlement which suits itself. Last October the Master of the Rolls critiicsed "an act of the shabbiest description" discreditable to such companies' reputation for decent, humane and reasonable behaviour; he warned them not to take advantage of an injured man, nearly always a working man, who might be suffering from shock, by putting before him a form when he had no-one near to advise him and then afterwards contending that, because he had signed the form, he had precluded himself from making a more advantageous claim. Does it pass the wit of man to substitute one foolproof remedy for the workman's triple choice and to develop our hospital services and other remedial facilities as part of a coördinated scheme of industrial compensation and State health insurance? We have no answer to the charge that the law of workmen's compensation fails to do anything for the medical care of the injured or unfit man, for his physical or vocational rehabilitation and his reabsorption into industry. We are backward in fracture clinics. If the general practitioner cannot provide the best diagnosis and treatment of the man's injury in his own home, the general hospital may also fall short; moreover it seldom keeps the patient long enough. Figures are offered to show that incapacity is far more prolonged, and permanent disablement far more likely, when the patient is not treated in a proper clinic. This brings us to problems of staffing the appointments in surgery. The Delevingne Committee report repeated somebody's blunt dictum that "there is no money in fractures" as far as surgical practice outside the hospital is concerned. If the fracture clinic is to be well organised, something must be done to offer the surgeon-in-charge a post which is pecuniarily attractive. Mention of the medical referee raises other problems; there are the old doubts of his independence and of the value of the final decision of a single arbiter, especially if he sometimes appears as an expert witness in the court of an adjoining district. Medical examination itself, moreover, seems to cause the workman misgivings. He goes before the insurance company's doctor like a plaintiff about to suffer cross-examination; the atmosphere is controversial; there are implied suspicions of malingering. There is no certainty that he will be allowed to have his own doctor present. He will inevitably dislike examination by a doctor known to have given evidence to the disadvantage of other injured workmen. As for the place of the examination, will it be his own home or his own doctor's consulting-room or will it be a solicitor's office?

These may be small points, compared with so fundamental a matter as our failure to furnish continuity and uniformity of treatment from first aid to rehabilitation; but, if we want the blessings of industrial peace and a contented society, we must remove the sense of injustice. And for this purpose there can be no better preparation than a study of this new work by Sir ARNOLD WILSON and Professor LEVY. WILSON'S courage of thought (as conspicuous

1. **Workmen's Compensation**, vol. II (Need for Reform). Sir Arnold Wilson, M.P., and Prof. Hermann Levy. London: Humphrey Milford, Oxford University Press. Pp. 366. 18s.

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as the physical gallantry with which he met his death), his gift of handling the statistics which in this subject are none too adequate, his industry and his astounding facility of quotation are here exemplified. Linked, not for the first time, with the solid abilities of the collaborator who survives him, they add one more to the series of reports which, like those of CHADWICK in the field of poor law and public health a century ago, compel social reform.

NEW DRUGS IN PROTOZOAL INFECTIONS

IN 1935 some continental workers recorded that the drug Synthalin (decamethylene-guanidine dihydrochloride) exerted a slight therapeutic action on certain pathogenic trypanosomes in mice. They ascribed this action to hypoglycæmia produced by the drug, an adequate supply of sugar being essential to the metabolism of trypanosomes, and not to a direct action of the compound on the parasites. WARRINGTON YORKE and his collaborators thought that a degree of hypoglycæmia sufficient to affect the trypanosomal infections would be incompatible with the life of the host, and decided to investigate the subject further. They found that, in vitro, synthalin exerted a direct and powerful trypanocidal action, a dilution of only 1 in 100 million destroying all the trypanosomes in a suspension of nutrient medium within 24 hours at 37° C. They further found that the degree of hypoglycæmia produced in the normal animal by synthalin in therapeutic dosage is not pronounced. The discovery that synthalin has a direct lethal action on certain trypanosomes opened up a wide field of biological and chemical investigation into the chemotherapeutic value of drugs of this and allied series in protozoal infections of man and of animals. This inquiry was followed by the preparation and trial of many compounds, of which three, produced by EWINS of May and Baker Ltd., have been shown by YORKE and his co-workers to possess considerable therapeutic promise. These are all diamidine compounds and are diamidinostilbene, diamidinodiphenoxypentane and diamidinodiphenoxypropane. Cases of human sleeping sickness, of human visceral leishmaniasis and of babesiasis in domesticated animals have now been successfully treated with these compounds; and information is being accumulated that not only are these drugs therapeutically active in such conditions but that in some of them they are superior to any remedy hitherto employed. This is more particularly the case in the Mediterranean and Sudan forms of visceral leishmaniasis, or kala azar, conditions with a very high mortality which are notoriously resistant to the antimony treatments normally effective in the Indian form of the disease.

Some figures collected by STEPHENSON,[1] showing the results of antimony treatment of cases of Sudan leishmaniasis, with others collected by KIRK and SATI,[2] showing those of treatment with the diamidines, illustrate this point. STEPHENSON saw 73 cases of Sudan leishmaniasis between the end of 1937 and the middle of 1939. Of these, 19 were admitted moribund and died before treatment could be begun. Of the remaining 54 cases, 25 died in hospital and 22 were discharged as presumably cured, but 11 of these subsequently died. Another 7 left hospital before completion of treatment and 6 of these later died. The standard treatment was a course of 4·8 g. Neostibosan, followed by a full course of tartar emetic, and in some cases by further courses of these drugs or of Anthiomaline. The total result was that of 54 cases treated only 12 were alive in January, 1940. KIRK and SATI treated 49 cases of Sudan leishmaniasis with the diamidines, of whom 8 died. Of these 8, 5 were moribund on admission, and 1, when progressing well, broke out of hospital on a debauch and died within 48 hours. Of the 43 cases which completed treatment 41 (95%) were provisionally regarded as cured. These results compare most favourably with those obtained with the antimonials. Cases treated by other workers in Palestine and elsewhere, both of the Indian and of the Mediterranean forms of kala-azar, show that the diamidines may effect a cure where antimony has previously been given and proved ineffective. In Africa these drugs are being tested on cases of human trypanosomiasis and have been found rapidly to produce sterilisation of the peripheral blood; early cases, as a result, are cured by them. So far there is inadequate information as to their effect on late cases with involvement of the central nervous system. In the veterinary field the diamidines have shown much promise in the treatment of the various forms of babesiasis, a condition responsible for great economic loss among dogs and domestic stock. The diamidines may be given to man in doses ranging from 0·5 to 2 mg. per kg. body-weight, either intravenously or intramuscularly. Owing to their greater solubility, diamidinodiphenoxypropane and diamidinodiphenoxypentane are more suitable for intramuscular injection than is the less soluble diamidinostilbene. The drugs may be given daily or on alternate days until 30, or even 60 or 90, injections have been administered. No serious accidents have so far been recorded, although certain immediate effects lasting about half an hour occur owing to a dramatic fall in blood-pressure. These are more pronounced when the intravenous route is employed, and vary from headache and dizziness with a rapid pulse, sweating and retching with occasional vomiting, to alarming symptoms in a small number of cases, where there may be syncopal attacks with temporary unconsciousness. These symptoms are all transient and last but a short time, and no permanent after-effects have been observed.

1. Stephenson, R. W. *Ann. trop. Med. Parasit.* 1940, **34**, 175.
2. Kirk, R. and Sati, M. H. *Ibid*, pp. 83, 181.

THERAPEUTIC RESEARCH LIMITED

FREEDOM and opportunity, as Sir HENRY DALE reminded the Royal Society on Monday, provide the conditions for the highest type of research. The quality of research is in fact determined by the character of those engaged in it and not by organisation or by the source of endowment. Stated thus the proposition sounds self-evident. Yet there is no denying the justice of the reproach made by the promoters of the new Therapeutic Research Corporation[1] that there has existed in the past a diffidence on the part of some academic research workers in this country to ally themselves wholeheartedly with the researches of industrial firms, or the rightness of the corporation's aim to establish closer liaison between industry and the research laboratories of the universities. It is only a couple of months ago that we remarked in

1. The constitution and object of the corporation were stated on p. 11 of our advertisement columns last week.

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these columns: "If ever there was a case for open and full coöperation here is one." Moreover the die was cast when in January, 1937, two medical men holding important academic positions became trustees under Sir HENRY WELLCOME'S will for the allocation to medical research of the profits of a great manufacturing and trading organisation. The new approach is less surprising when one reflects that the research staffs of the most individualistic concerns have fraternised freely in the past. Knowledge has an instinctive urge to companionship and the most jealously guarded secrets have been those with nothing substantial to conceal. There is a little more to it than a common research pool. Five laboratories—and there is nothing to prevent others coming in—with highly trained staff and elaborate equipment will now be able to concentrate on the solution of any new problem. And, perhaps the best feature of all, any new drug which may be discovered will not be monopolised by one member of the corporation. This will facilitate the known intention of the Medical Research Council to undertake chemotherapeutic research on a much larger scale in the future. Clearly there is no room here for the relaxation of the rigid standards of true science in favour of policy or propaganda which the President of the Royal Society regards as a danger to be foreseen and resisted.

CADMIUM POISONING

IF we know cadmium at all most of us would recall its brilliant sulphide, which as Cadmium Yellow is familiar in the paint-box and was thrown down by H_2S from acid solution in our analytical tables. It occurs in nature as the sulphide in association with zinc ores, chiefly in Scotland (as "greenockite"), in Czechoslovakia and in Pennsylvania. It is a bluish-white metal which takes a high polish, and can easily be deposited electrolytically from a cyanide bath. Lately it has come to be increasingly used for plating in place of silver, nickel and chromium, and it is this that has led to trouble. There have been instances of poisoning from the inhalation of dust containing cadmium in zinc works, but most of the recorded cases have arisen from the unwise use of cadmium-plated vessels containing foodstuffs, because cadmium is readily corroded by acetic, tartaric, citric and lactic acids and therefore by foodstuffs containing vinegar, fruit acids and the like.

On another page Dr. A. T. W. POWELL recalls eight cases of poisoning resulting from the preparation of "lemonade" ices in refrigerator trays replated with cadmium. In his report for 1935 the Chief Medical Officer of the Ministry of Health recorded the poisoning of three people by cadmium falling into their food from the reflector of an electric cooker. Dr. POWELL also draws attention to 208 cases of cadmium poisoning reported in the U.S. Navy,[1] where foodstuffs had been in contact with cadmium-plated utensils for 1½–14 hours. It was found there that anything over 15 parts per million of cadmium might produce symptoms of poisoning, and some of the navy men had drunk lemonade containing 100 p.p.m. A few months ago FRANT and KLEEMAN[2] reported five outbreaks in the United States, involving some 50 people in all. One of these, in which at least 29 school-children were affected, was traced to cadmium contamination of popsicles—flavoured ices frozen on a stick. Here too the popsicle moulds had been replated with cadmium. In these cases the symptoms are those with which the wise student defeats his examiner when asked for the symptoms of irritant poisoning—vomiting, diarrhœa, abdominal pain, and the symptoms and signs of dehydration—and the violent evacuation seems to prove effective, for fatal cases are rare. In the popsicle epidemic all the children recovered completely in 5–6 hours. Cases due to inhalation are less common but may be more deadly. In 1858 SOVET[3] reported poisoning in three domestic servants who inhaled the dust when polishing silver with cadmium carbonate. Here the symptoms were collapse, cramps in the legs, headache, a feeling of constriction in the throat, continuous vomiting, and blood-stained diarrhœa with colic. One of the three also developed pneumonia and nearly died. Sir THOMAS LEGGE, in his factory report for 1923 (p. 74), reported poisoning in an engineer and two workmen who inhaled fumes while melting down ingots of cadmium in an ill-ventilated factory. The engineer died, and the autopsy showed congestion of the larynx, trachea, bronchi, stomach and intestine, with fatty infiltration of the heart and liver, and congestion of the spleen and kidneys. Curiously enough, chemical analysis of the viscera revealed no trace of cadmium. Chronic poisoning has been extensively studied in animals, but seems to be rare in man. STEPHENS,[4] however, has reported 9 cases of chronic poisoning. One was an elderly zinc smelter who had received compensation for plumbism, but at autopsy he was found to have chronic interstitial nephritis and cardiac hypertrophy, and his liver contained nearly a grain of cadmium to the pound. It seems, therefore, that despite the severity of the local action on the stomach, a certain amount of cadmium may gain access to the body tissues.

In the factory where ores containing cadmium are smelted, or wherever dust or fumes of cadmium may be in the air, prevention must depend on adequate ventilation, supported when necessary by masks. But for the commoner danger prophylaxis is simpler: cadmium plating, however desirable it may be for motor-car parts, must not be used for utensils which may come in contact with foodstuffs.

1. Quoted from *U.S. Naval Medical Bulletin* in *Chem. Age, Lond.* Nov. 15, 1941, p. 259.
2. Frant, S. and Kleeman, I. *J. Amer. med. Ass.* 1941, **117**, 866.
3. *Pr. méd. Belge*, 1858, **10**, 69.
4. Stephens, G. A. *J. industr. Hyg.* 1920–21, **2**, 129.

POST-WAR HOSPITAL POLICY.—Replying to Captain Elliston's question in the House of Commons on Dec. 2, Miss Horsbrugh gave the following terms of reference for the survey of London hospitals:

To survey the hospitals (other than mental hospitals and mental deficiency institutions) in London and the surrounding area; and having regard to the information thus obtained, and to the general principles of post-war hospital policy laid down by the Minister of Health in the House of Commons on Oct. 9, to advise the Minister what area would appropriately be served by a hospital system centred on London, and what modifications or extensions of the existing hospital facilities would be necessary or desirable to give effect to that policy.

Dr. A. M. H. Gray and Dr. A. Topping are to make the survey and have already started on the preliminary work.

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Annotations

ECONOMISE NOW

As the inexorable economic war gains momentum, it is not surprising that produce other than food is coming more and more under the surveillance of Government departments. The man in the street is well aware of the shortage of supplies in many pharmaceutical requirements such as dusting powders, ointments and liquid paraffin. The physician too is beginning to feel that the war is cramping his style as a prescriber, but restriction of supply has served to show how difficult it is to abandon or even modify the prescribing habits of a lifetime; in fact, many recipes have become reflexes. Nevertheless, if we are to avoid the nightmare of actual rationing of drugs, we must wake up to the fact that we must economise now. Happily, when we set out to produce a particular therapeutic action there are often several ways of achieving the desired result; and when we have to choose a preparation of a drug, a great deal of latitude is permissible without significantly altering the pharmacological action. Thus there is plenty of scope for economy in prescribing; and the matter rarely involves sacrifice by anybody, though it needs forethought by the doctor. Just now the common drugs which must be used sparingly are aspirin and phenacetin, alcohol, glycerin, glucose, mercury and liquid paraffin, and unless the non-essential uses of these are curtailed those whose health really depends on them will have to go short. Even where one of them is certainly needed we must avoid ordering 8 oz. when 6 oz. will do, and the direction on the aspirin should read: "Take one, and repeat if necessary," not "Take two." Before prescribing any drug, the practitioner might well ask himself two questions. First, is the substance chemically similar to any foodstuff or material which is now rationed? And secondly, does the drug come from abroad? Liniments are half-cousins to the salad dressings of happier days; ointments should be regarded with the respect we pay to the butter ration; and the recollection that glycerin is an alcohol should inspire that conservatism which evokes from the canny host an agonised "say when!" It is often forgotten that malt is primarily an emulsifying agent, and we are apt to credit it with almost mystical nutritional qualities which it certainly does not possess. War babies will be found most accommodating in swallowing cod-liver oil neat instead of malt and oil; and the substitution of vitaminised (arachis) oil should always be considered when prescribing vitamin D for children. The conservation of drugs coming from abroad presents a different problem, but experience suggests that it should not be insoluble. No-one will doubt our desire to assist the Government in its economy campaign, and when the doctor errs it is usually because there is nothing to remind him of the need for caution. These are conditions which lend themselves to the use of propaganda. We are no less susceptible than the lay public to suggestion and reiteration. Eye-witness accounts of the hardships our merchant seamen undergo in order to bring essential supplies to this country are occasionally broadcast by the B.B.C. In addition to their dramatic value, these vivid descriptions of superb acts of heroism on oil tankers make every one of us think twice before using petrol unnecessarily. What is true of fuel is also true of many drugs. How can the fact be brought home to the busy practitioner? Thumbnail pictures by a Bernard Partridge or a Matania providing graphic records of these sagas of the seas might be stuck on bottles and containers used for many of the drugs in classes B and C. The greater the variety of pictorial labels the more sustained would be the interest of both doctor and patient. Furthermore the scheme could easily be extended to the use of labels which would indicate the country's approval of the physicians' choice of drugs. These pictorial reminders would undoubtedly stimulate the interest of the profession in the Therapeutic Requirements Committee's classification of drugs—an interest which will otherwise be difficult to arouse. The method is unconventional, but some sacrifice of the conventions is unavoidable if we are to cope successfully with a problem which is demanding the immediate attention of every registered medical practitioner.

QUESTIONABLE LIPOIDOSES

THE publication of a work on the lipoidoses by Thannhauser (reviewed on p. 700) will raise recent controversies anew. Within the last few years Tay-Sachs's disease and chondrolipodystrophy (gargoylism) have been added to the list of lipoidoses, yet Thannhauser has excluded both from his monograph. Either he does not regard these conditions as lipoid disorders, or else he considers their status to be still undecided. A discussion, by one who has contributed so much in this field of medical research, of the relationship of these two diseases to the lipoidoses of known causation would have been extremely welcome; for in the better-known lipoid disorders the nature of the biochemical disturbance has been elucidated and the character of the excessive lipoid demonstrated. Xanthomatosis, embracing many clinical types including the Schüller-Christian syndrome, is a cholesterosis; Gaucher's disease, a cerebrosidosis in which there is an accumulation of kerosin; and Niemann-Pick's disease, a sphingo-myelinosis. Thannhauser emphasises the modern conception that the fundamental disturbance in the lipoidoses is an imbalance of intracellular lipoidases in the reticulo-endothelial system. In Tay-Sachs's disease and chondrolipodystrophy (gargoylism) the nature of the lipoid error is unknown. The rarity of these conditions, and the difficulty of obtaining post-mortem material which has been suitably fixed for biochemical analysis and lipoid staining, are the principal causes of the failure to elucidate the precise nature of the metabolic disturbance in them; but it would seem unjustifiable to exclude these diseases from the category of lipoid disorders on this account, since they have many clinical and pathological features in common with the other lipoid diseases. Moreover, foam cells, the most characteristic feature of the lipoidoses, were demonstrated by Bielschowsky in the spleen in a case of Tay-Sachs's disease recorded by Brouwer[1]; and widespread infiltration of the tissues with a heavy deposit of a lipoid substance was observed by Kressler and Aegerter[2] in a typical case of chondrolipodystrophy. Only further pathological and biochemical investigation can settle this vexed question to the satisfaction of everyone, and the fullest use should be made of every opportunity for doing so.

EXTRAVASATION OF URINE

THE pathogenesis and mechanism of urinary extravasation have excited much comment in their time. Earlier observers believed that the urethra dilated behind an obstruction—nearly always a stricture—and gradually became attenuated until it suddenly gave way, usually while the patient was straining at micturition. This concept of the process was suggested by the frequent history of long-standing obstruction followed by a feeling of "something giving way" and temporary relief; however, besides being open to other objections, it failed to explain the cases without organic obstruction where the patient continues to pass urine naturally. These are commoner than is generally imagined and probably constitute about 15% of all cases. The purely hydrostatic theory, although not completely discarded, has been largely superseded by the view that urinary extravasation is more of the nature of a severe cellulitis spreading from the urethra, associated in many instances with the presence of gas-forming anaerobic organisms. There is

1. Brouwer, B. *Proc. Roy. Soc. Med.* 1936, 29, 579.
2. Kressler, R. J. and Aegerter, E. E. *J. Pediat.* 1938, 12, 579.

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no doubt however that urine does pass into the tissues at the same time, since Kidd[1] showed that the fluid drained from the infiltrated tissues contained urea. Wesson[2] successfully reproduced the clinical mode of spread of the condition experimentally by injecting coloured fluid through the urethra into the superficial perinæal pouch in cadavers, and more recently Finestone,[3] in an attempt to confirm the hydrostatic theory, has carried out a series of rather similar experiments in which the spread of the injected solution (sodium iodide) was checked by serial radiograms as well as by dissection. He was able to reproduce the clinical spread of extravasation only in the superficial perinæal pouch and over the scrotum, the injection failing to pass up over the anterior abdominal wall or to involve the penis. He suggests that this failure was due to lack of tone in the scrotum of the cadaver and to the absence of the inflammatory element. In several instances the bulb of the urethra was accidentally pierced by the needle and the vascular tree injected. The ease with which this occurred suggested that the importance of the vascular arrangement in this region has not been sufficiently considered in previous conceptions of the pathology of urinary extravasation. Whether inflammatory or not, the disease process in its spread from the urethra must involve the corpus spongiosum with resulting thrombophlebitis. This would account for the severity of the general symptoms, which are particularly serious in those patients who continue to pass water naturally, since the contraction of the bulbo-cavernosus with each act of voiding helps to spread the inflammation. This affords a sound argument for the diversion of the urinary stream, particularly in such cases. In summarising, Finestone tries to correlate the evidence in favour of the two theories of urinary extravasation, but does not make it clear to which view he adheres himself. His experiments confirm rather than exclude the importance of the infective element.

DEVELOPMENT OF MITRAL STENOSIS

IT has apparently been accepted without question that mitral deformity takes place slowly. Had there not been much truth in the tradition it would have been questioned long ere this, but Glazebrook and Scott Thomson[4] of Edinburgh have questioned it now. They report 5 cases of rheumatic fever, in 3 of which physical signs of mitral stenosis appeared within sixty days of the onset of the illness, while in the remaining 2 physical signs of aortic incompetence appeared within twenty days and disappeared after persisting for two months and seven months respectively. This last observation is scarcely unexpected, but the evidence in favour of their first observation is by no means complete. None of their 3 patients gave any history of previous rheumatic infection but one was aged 16 and two 15; the mere fact that signs of mitral stenosis developed, or were detected, during the illness reported suggests strongly that there had been a previous attack, especially in view of the statement that typical radiological signs of mitral stenosis were observed by the fourth and ninth weeks of the illness. The authors of the paper argue that because the subcutaneous rheumatic nodule goes through the stages of inflammation and repair with scarring in the space of a few weeks the same time interval probably applies to a similar lesion on a heart valve; but conditions in a heart valve differ considerably from those in the subcutaneous tissues. It is well known that during the febrile stage of rheumatic fever a soft presystolic murmur is occasionally heard at the apex, presumably from dilatation of the mitral ring, the consequent tautness of the chordæ tendineæ producing a relative stenosis of the mitral valve; but this murmur nearly always disappears as the acute stage of the illness subsides, and presumably the presystolic murmur detected by the Edinburgh observers was not of this type. That the valvular changes in rheumatic fever may occasionally result in stenosis within a comparatively short time is undoubtedly true; but Linnell and Thomson[5] put the time limit at six months, which probably represents the consensus of clinical opinion on the subject. The Edinburgh findings are interesting, but until more evidence is available most clinicians will continue to work on the assumption that the development of a characteristic apical rumbling diastolic murmur during an attack of rheumatic fever points to a previous attack.

1. Kidd, F. S. Common Diseases of the Male Urethra and Cervix, London, 1917, p. 124.
2. Wesson, M. B. *J. Amer. med. Ass.* 1923, **81**, 2024.
3. Finestone, E. O. *Surg. Gynec. Obstet.* 1941, **73**, 218.
4. Glazebrook, A. J. and Thomson, S. *Edinb. med. J.* 1941, **48**, 669.

THE LITTLE MORE

Lord Woolton is justly proud that today our food is more evenly distributed than ever before. But though everyone is getting an adequate ration there is not much margin, and fads or dislikes may upset the balance of a finely adjusted diet. Many of us have to manage without some of the semi-essential luxuries to which we were accustomed, and especially among children an anxious watch is being kept for signs of deficiency diseases. In his presidential address to the Society of Medical Officers of Health on Nov. 21, Sir Alexander Macgregor told how a survey of the records of over 20,000 children under two years of age visited by the Glasgow health visitors during the first three months of 1939 and 1941 showed that under war-time conditions the incidence of rickets for the city as a whole had fallen, but that there was a fractional increase of mild rickets in some of the poorer localities. At Great Ormond Street Dr. Paterson and Dr. Daynes[6] have reported 8 cases of scurvy among some 6500 patients treated up to the beginning of October this year as against 2 cases among 10,000 patients last year. These are perhaps examples of vigilance rather than disease but they show that the Government's proposed free distribution of fruit juice and cod-liver oil to infants is a wise precaution. Though our health is so good nutritionists are still prepared to take a benevolent interest in us. The L.C.C. and other authorities have received supplies of vitamins from America to carry out controlled experiments on their school-children. But in war-time the exact goal of research must depend on the data we can obtain, and it is better to leave our destination vague until we know something of the land we are exploring and the condition of the roads on which we will travel.

TREATMENT OF THE MENOPAUSE

THE increasing popularity of stilbœstrol in the alleviation of menopausal symptoms has perhaps tended to an enthusiastic misapplication of this drug. While most writers speak favourably of their results from this therapy, there are a few voices raised in protest and condemnation. Stilbœstrol is so cheap and simple to take, and its results in many cases are so dramatic, that it is only natural for practitioners to prescribe this drug to any woman whose symptoms of whatever nature are reasonably referable to her climacteric. There are, however, certain indications and contra-indications that should be more fully defined and more widely appreciated. The use of stilbœstrol is primarily therapy by substitution, the deficient hormone being, in the case of the menopausal patient, the naturally occurring œstrin. If we are to prescribe stilbœstrol reasonably and effectively it behoves us to define which, if any, of her symptoms are due to this œstrin deficiency. The symptoms of the menopause may be, broadly speaking, divided up into groups: amenorrhœa, vasomotor or circulatory symptoms (such as hot flushes, tachycardia, palpitation), dyspnœa, vertigo, cold hands and feet, numbness and tingling; nervous mani-

5. Linnell, J. W. and Thomson, W. A. R. *Brit. med. J.* 1938, **2**, 442.
6. *Brit. med. J.* Nov. 29, 1941, p. 787.

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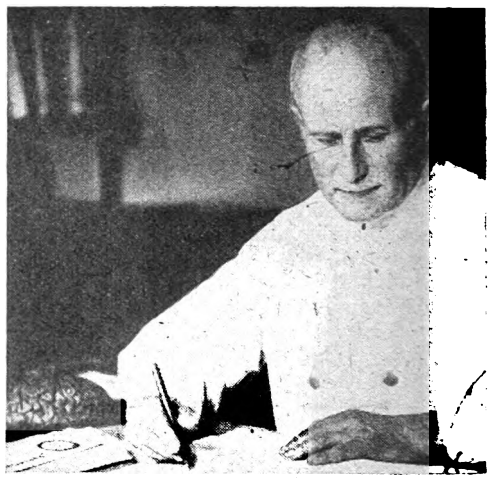
festations such as excitability, irritability, headache, loss of memory and power of concentration, insomnia, and depression psychosis; and a number of gastro-intestinal symptoms such as dyspepsia, flatulence, nausea, constipation and the like. One or two of these groups may dominate any given clinical picture though the patient will often produce a hotch-potch of the lot. The presence of hot flushes and other somatic sensations may well be responsible for irritability and depression and a timely treatment of the vasomotor symptoms will result in a disappearance of the emotional counterpart. But Heaver [1] points out that unless the patient's exaggerated emotional response is directly related to these vasomotor phenomena stilbœstrol may do harm rather than good. He is inclined to regard the menopause as a causative factor in precipitating an unstable patient into a state of involutional melancholia; and he states categorically that 4% of all mental diseases are to be traced to this specific source. He does not agree that the endocrine upheaval of the menopause is responsible for the psychosis, and believes that such a case is better treated by a psychiatrist. Substitution therapy by stilbœstrol in such cases may stimulate ovarian and genital activity and so increase the emotional chaos that the physician is only anxious to soothe. Heaver treated 26 established cases of menopausal psychosis with stilbœstrol: 66% of the women so treated showed withdrawal bleeding and 23% other toxic side effects such as enlargement and fullness of the breasts, areolar pigmentation, increased sexual feelings, nausea, diarrhœa and even dysmenorrhœa. From a psychological point of view 43% were unrelieved and 38% were definitely in a worse state than before treatment. The crux of the problem is whether it is justifiable to attempt to relieve vasomotor symptoms at the expense of exaggerating other aspects that contribute to the psychosexual conflict which is in part responsible for the development of the psychosis. Heaver replies that such symptomatic treatment is wholly unjustifiable. The general employment of a potent and readily obtainable drug, such as stilbœstrol, raises once more the question of more remote dangers of œstrogen therapy. No actual evidence is clinically available that this substance is in man a carcinogen, yet no-one would sponsor its exhibition in say a case of established breast or uterine cancer. Moreover, the œstrogens have a remote effect on other body structures than the genital organs, certainly in small animals, where pituitary tumours have been produced. No such effect has yet been seen in human cases, but until further evidence accumulates it is as well to curb indiscriminate dosage for mild symptoms with this drug. Finally, some patients seem to acquire almost a drug addiction to stilbœstrol and once they get the taste are difficult to wean from its subtle attraction. It may well be said that all this is nebulous and fanciful, but none the less until the risks can be completely assessed the wise physician will restrict the use of stilbœstrol and other œstrogens to those cases where the indications are clear-cut.

HANS BERGER

Professor Berger died on June 7, aged 68 years. He had lived in Jena all his life, and all his work was done in the university there, where he held the chair of psychiatry and was director of the university clinic for nervous and mental diseases. Although he was a clinical psychiatrist who saw the great advances in analytical psychology modifying the approach to the psychoses which had previously been fundamentally organic (or "clinical"), he spent his life investigating mental diseases by physiological experiment. In this he was practically alone in his country, but in spite of ridicule he persistently studied the physical minutiæ of the brain in health and disease. In the late 'nineties he was measuring cerebral vascular changes, and at the turn of the century he was recording cerebral temperature with great accuracy. As these studies seemed to yield little he began in 1902 to look for electrical changes in the brain. This search was based on the tentative conclusions of Canton, von Monakow, Beck, and Horsley, but it was hampered by the limitations of electrical recording available thirty years ago. Berger employed each advance in physical knowledge as it arose, believing that the change he hoped to demonstrate required more sensitive methods of recording. So his work developed with the capillary electrometer, the string galvanometer, the thermionic valve, and finally the cathode ray oscillograph.



In 1924 Berger was able to record minute electrical fluctuations from the brain of a patient who had a skull defect. He then began to study the phenomenon with Teutonic thoroughness, so that when he published his first observations five years later he had acquired a wealth of data which formed the basis of electro-encephalography. In the years which followed, before his work had been recognised or had been given the seal of respectability by its confirmation in the orthodox schools of physiology, he conducted a logical series of clinical investigations backed by animal experiments. He described the characteristics of the electro-encephalogram, the alpha and beta rhythms, and their modification by all forms of stimuli and experimental changes, and he also drew conclusions as to their origin and propagation. He found that detrimental factors caused slowing or abolition of the alpha waves, and he described abnormally slow waves around cerebral tumours and abscesses, in anæsthesia, and in coma due to many causes, including high intracranial pressure. He recorded abnormal waves in some forms of psychosis, especially in the dementias, and he also made important negative observations, as in the extrapyramidal diseases, in which the electro-encephalogram is normal. His initiative and perseverance were the more remarkable, not only because he was alone in this field of neurophysiology, but because electrophysiologists were concerned with single neurones and nerve-fibres, while the simultaneous change in millions of cells was unorthodox and considered hardly scientific. When his work was criticised he answered criticism by further successful experiment, and he had to modify few of his many conclusions.

As is the way with prophets Berger first received recognition abroad, and it is recorded that, when hailed as a distinguished visitor at the Paris congress of psychology in 1937, he said with feeling "In Germany I am not so famous." Even in the last years he continued to work quietly and undisturbed until his death.

Hans Berger was not an extraordinary man, nor was he an outstanding intellectual, but using all his talents fully in the course he had set for himself he made rare advances in knowledge and gained an honoured place in medicine.

Dr. WILLIAM EVANS, physician in charge of the cardiac department of the London Hospital, will deliver the third Strickland Goodall lecture, at Apothecaries Hall, in June, 1942. His subject will be triple rhythm.

WE regret to announce the death, on Nov. 20, in Dublin of Dr. T. HENRY WILSON, a former president of the Royal College of Physicians of Ireland, and King's professor of midwifery at Trinity College.

1. Heaver, W. L. *Amer. J. Obstet. Gynec.* 1940, **40**, 980.

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Special Articles

BUILDERS MUST PLAN

"From the siting of a factory to the provision of a children's playground we are concerned with the right use of the land, and that is Planning."
Lord BALFOUR OF BURLEIGH.

SOME parts of our cities should have been built again long ago; some will have to be built again because they are lying flat. The opportunity ahead has been clearly stated for Birmingham in a study [1] made by the Bournville Village Trust of conditions of living and working there. The trust decided to begin the research in 1935; the material took three years to collect, and now appears in a well-illustrated book. The city can be conveniently divided into the central wards where population density reaches 62 people per acre, the middle ring with 32 people per acre, and the outer ring with 15 people per acre; this gives an average density for the city of 20 people per acre, which compares favourably with the county of London where the average pre-war density was 54, and the density in Stepney 238. Birmingham had no charter until 1838 but attracted many skilled workers in base or precious metals and other trades. In the nineteenth century growth of industry fired those speculative builders who, careless of life and health, set up street after street of back-to-back houses, of which no less than 38,000 still remain in the central wards and in parts of the middle ring. They were originally built without internal water-supply or sink, and many still have only one standpipe in the courtyard to serve a dozen or more houses. Every house in the row is surrounded on three sides by similar houses so that through ventilation or adequate lighting cannot be attained. Later, by-laws demanded air space on at least two sides of every dwelling, and those tunnel-back houses sprang up which still occupy miles of streets in the middle ring. The building of tunnel-backs, so called because the rear of each house juts backwards in a narrowing projection leaving a dank strip of yard between itself and the tunnel-back of the next house, was a nefarious way of keeping within the law and crowding houses into a site with a density of 20 or 30 to an acre. At the end of the nineteenth century came the garden city movement, bringing the semi-detached house intended for wide frontages and low density. The speculative builders snapped up the idea without conforming to the low density plan, and built thousands of closely-packed semi-detached houses in the suburbs of Birmingham, tricked out with aimless decoration which satisfied the taste of their customers without educating it.

These, then, were the three main types of house in Birmingham when the City Council undertook an inquiry in 1913; their report appeared three months after the beginning of the last war and recorded that 50,000 houses were unfit for habitation, many of them being overcrowded as well. At the end of the war building costs had risen and speculative building no longer paid; under the Housing Acts of 1919, 1923, and 1924 the municipal authorities received help which gave them the field to themselves for almost ten years. In Birmingham, 3234 houses were built under the 1919 Act, 3433 under the 1923 Act, and (over a period of 8 years) 33,612 under the 1924 Act, the result being movement of population towards the outskirts. By 1930 building costs had fallen sufficiently for private enterprise to take a hand again, and the Housing Acts of 1930 and 1935 enabled local authorities to concentrate on slum clearance and the abatement of overcrowding. Much good work had already been done, but the slums still remained. Indeed, in the middle wards, apart from provision of a separate water-supply in many houses previously without, little change had been made since the 1913 report. The number of houses built since 1920 has been greatly in excess of the corresponding rise in population, but on the other hand the average family has been growing smaller, and thus the number of families needing houses has increased out of proportion to the rise in population. However, about 10,000 houses were condemned, and about 8000 pulled down between 1930 and 1938. Meanwhile private building between 1935 and 1938 was going on at the rate of 7000 houses a year in the outskirts of the city, and at the same time the corporation was building at the rate of 2500 a year. All the municipal houses were earmarked for the occupation of families displaced from the slums. Yet despite this, progress "was hardly sufficient to ensure the abolition of the slums within any tolerable period": so in 1938 the city council launched out on a five-year programme of building at the rate of 5000 houses a year. Even this number fell short of the minimum actually required within the five years, a number estimated at 17,500 for slum clearance, 3500 to abate overcrowding and 8000–10,000 to meet normal needs.

The plan has of course been interrupted by the war, but the trust in their report consider how it should be resumed when the time comes. Householders in all three regions of the city have been questioned and factory sites, transport and rentals studied, in an attempt to bring the whole mass of conflicting interests into unity. The writers of the report conclude that individualism must be tempered to fit civilisation; the city's problems must be integrated with those of the region, those of the region with those of the country as a whole, and "these in turn must be examined against the matrix of the world problem." And they are supported by Lord Balfour's definition of planning in a foreword to the report. To acquire further building land beyond the city boundaries would increase transport difficulties, and make the countryside still less accessible. The worst difficulty of planning is in the old jewellery quarters of the central wards where many small factories are thrust in among the dwellings. There is no simple solution, as the report points out, but the best plan here seems to be to build flatted factories five or six stories high, which could rehouse existing factories in less than half the space. This would make it possible to include extra services—good working accommodation, canteens, laundries, rest rooms, first-aid posts, garages, repair shops, car parks, and cycle sheds. Similar factory centres or flatted factories could be built scattered through the city and suburbs alike, and this would enable a larger number of people to live near their work. Many of the largest factories must remain where they are because removal would be too costly and complicated. Others could be removed beyond the city boundaries to form the nucleus of satellite towns. As to rehousing workers, the report shows that preference among Birmingham residents is for the separate house with a garden, but in the central wards this would simply not be possible. There is no solution for the 130,000 people living there except transfer to modern flats, maisonettes and well-planned terraced houses, built not as competing alternatives but as part of a housing scheme. The flats, like the factories, would have communal advantages—central heating, hot water, playgrounds, creches and lifts; and wide through roads and boulevards to the city would help to ease transport difficulties for those living on the outskirts.

To carry out these improvements the Bournville trust suggest that a national planning authority should be established, that the present system of land tenure should be reformed to ensure control of land for use in the public interest, and that expansion of the present city area should be stayed by enforcing the maintenance of an agricultural green belt. They propose, too, that the life of buildings should be limited by licence so that plans for reconstruction could be eased and synchronised.

1. When we Build Again. London: George Allen and Unwin. Pp. 138. 8s. 6d.

DENTAL MEDICINE AT HARVARD.—On Sept. 23 the new Harvard School of Dental Medicine was opened with nine students selected from different parts of America. The school has been made possible by an endowment of $1,500,000, most of which was contributed by the Carnegie, Rockefeller and Markle foundations. Under the present plan of instruction no more than 15 students may be accepted in any one class. At the new school the combined course of dentistry and medicine will last for five years and students will receive both the M.D. and D.M.D. degrees. The existing Harvard Dental School will continue its present courses for three years more until members of the present second-year class are graduated.

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GENERAL MEDICAL COUNCIL

WINTER SESSION, NOV. 25–28, 1941

AT the conclusion of the President's address, reported last week (p. 677), Dr. Thomas Fraser was introduced by Sir Henry Brackenbury as direct representative for Scotland, Prof. W. J. Wilson by Prof. C. G. Lowry as representative of Queen's University, Belfast, and Prof. L. G. Parsons by Dr. Guy Dain as representative of Birmingham University.

Five names were, after deliberation in camera, restored to the Medical Register: *John William Paterson Collier*, *William Joseph Doody*, *William Aloysius Kennedy*, *Francis Stedman Poole* and *James Pearson Thierens*.

Charges against Medical Practitioners

REPORTED CONVICTIONS

The council then considered thirteen charges arising out of convictions for drunkenness, but did not erase any names save those of *John Mackay Young*, M.B. N.Z. (1923) and *John Black*, M.B. Belf. (1921). In addition to two convictions for being drunk and disorderly Dr. Black had been sentenced to one month's imprisonment with hard labour for obtaining credit by fraud.

CHARGES OF IMPROPER CERTIFICATION

The case of *Alexander Cannon*, registered as of 38, Harley Street, London, W.1, M.B. Leeds (1924), who appeared before the council on the following charge:

That being a registered medical practitioner (1) You on July 15, 1941, signed and sent to one Herbert Latreille, a district warden on the whole-time paid strength of the A.R.P. wardens establishment of Beckenham, a certificate, notification, report, or document of a similar nature dated July 15, 1941, in the following terms:—

To whom it may concern: This is to state that Mr. Herbert Latreille is under my care and requires an immediate rest owing to the state of his nervous system and I have ordered him away for a rest from the 19th instant for a period not less than three weeks. In my opinion it would be criminal to allow him to continue his work at present. ALEXR. CANNON.
ALEXANDER CANNON, K.G.C.B., M.D., etc.

whereas you had neither seen nor examined the said Herbert Latreille at any time during the calendar year 1941, and such certificate, notification, report, or other document was misleading and improper.

(2) You on October 22, 1940, signed and sent to the said Herbert Latreille a certificate dated October 22, 1940, in the following terms:—

This is to certify that Herbert Latreille of Beckenham Kent is suffering from nervous exhaustion and sympathetic atonia and urgently requires 14 days rest from all duties with complete change of air away from England. ALEXR. CANNON.
ALEXANDER CANNON, K.G.C.B., M.D., Ph.D., D.P.M., etc.

whereas you had neither seen nor examined the said Herbert Latreille since March, 1940, and such certificate was misleading and improper. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

Dr. Cannon conducted his own defence. The council's solicitor said that Mr. Latreille applied in July, 1941, to his employing local authority for sick leave in order to spend three weeks in the Isle of Man under treatment by Dr. Cannon. He submitted a medical certificate from a local practitioner, stating that he was suffering from boils and was recommended "three weeks' holiday (for special treatment) on the advice of his specialist." The local authority refused the sick leave but granted twelve days' ordinary annual leave. Mr. Latreille then sent to the chief warden the medical certificate, the subject of the first charge, which he had received the same morning, July 18. This document purported to "state," not to "certify," the matter contained in it. The local authority accepted this certificate and granted Mr. Latreille his sick leave. Dr. Cannon, when asked to explain why he had given it, wrote that he had been under the impression that a specialist could send a statement regarding a patient who was under treatment to anyone without actually seeing the person concerned. He had therefore commenced the document "This is to state"; but in a later certificate which he had issued on August 8 after seeing Mr. Latreille he had written "This is to certify." He had treated Mr. Latreille from time to time since the beginning of 1937, the latest occasion being in December, 1940. It was arranged that he should come to the Isle of Man on July 19, but two days beforehand his wife had telephoned saying that the local authority, although he was very ill, would not let him come because he had not a medical certificate. Dr. Cannon had explained to Mrs. Latreille that he could send the medical statement to get over the immediate difficulty, and then when he saw the patient he could issue the medical certificate. This he had actually done at the end of the three weeks' treatment. The facts he had stated and certified were, he wrote, true, and he asked the council's forgiveness for any offence against its rules.

In a further letter Dr. Cannon declared that he had known Mr. Latreille's condition immediately before issuing the statement of July 15; "having spoken to his wife and then himself on the phone and having made hypnotic diagnosis through a third party that day, and which method is often more reliable than ordinary clinical findings, and as you know, the Hippocratic Oath allows me to use any means of diagnosis and treatment." In another communication, when asked to admit that he had not seen Mr. Latreille at any time between Jan. 1 and July 15, 1941, and between March and Oct. 22, 1940, he replied that he had not seen, but had spoken to and examined the patient hypnotically on three dates during the interval in 1940 and had a telephone call and contact with him again on Oct. 22, 1940; in 1941, before July 15, he had spoken to the patient and examined him hypnotically on five dates. On each of the dates when he had issued a statement or a certificate he had spoken to Mr. Latreille and examined him hypnotically. He also sent to the registrar a copy of his book "Sleeping through Space," a chapter of which explained briefly the method he used.

The council's solicitor maintained that both documents were certificates within the meaning of the council's warning notice. He called Mr. W. J. Sampson, mayor and chief warden of Beckenham, who identified the 1941 statement and testified to the circumstances in which he had received it.

Mr. Latreille gave evidence for the defence, confirming Dr. Cannon's written explanation and saying that the documents had truly stated his condition. Dr. Cannon gave evidence on his own behalf and answered questions put by members of the council. After the council had delibérated in camera, the President announced their finding as follows:

Dr. Cannon: I have to announce that the facts alleged against you in the charge have been proved to the satisfaction of the council. The council cannot avoid the conclusion that the certificates signed by you in your professional capacity which form the subject of the charge were certificates of the type stigmatised in para 1 of the warning notice issued by the council as untrue, misleading or improper. This paragraph is presumably within your knowledge, and the attention of the profession was drawn to its special importance under all conditions by an announcement published on behalf of the council in the professional journals in April, 1941. The council regard your action in giving the certificates as a serious breach of the trust which Parliament has confided to the members of the medical profession. They have listened to the description of the circumstances in which these misleading and improper certificates were given by you. They do not regard that as affording any excuse for your laxity in giving them. They take a grave view of carelessness in issuing certificates required by public authority; but from your statements they are prepared to believe that you sent the certificates, not from any perversity or desire to falsify, but from a mistaken view of your duties and an error of judgment. Taking that into account, and believing that the warning you have received will be sufficient, they have not directed the registrar to erase your name from the Medical Register.

* * *

The case of *Albert Alexander Gunn*, registered as of 3, Carr Wood Road, Pownall Park, Wilmslow, Cheshire, M.B. Edin. (1898), who had been summoned to appear before the council on the following charge:

That being a registered medical practitioner you on March 5, 1941, gave certificates, notifications, reports, or documents of a similar nature in your professional capacity for subsequent use for administrative purposes under the National Service Acts, 1939 to 1941, in the cases of John D. Collings, Phillip Connell, Peter H. Goddard, David Hobbs, David H. C. Mason, and Roger Wakefield, who were inmates of an institution maintained by an unqualified person, one G. H. Lyward. You had not seen or examined the persons for whom you gave the said certificates or other documents either on March 5, 1941, or at all, and the said certificates or other documents were accordingly misleading and improper.

Dr. Gunn was represented by Mr. A. A. Pereira, instructed by Messrs. Le Brasseur and Oakley, on behalf

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of the London and Counties Medical Protection Society. The council's solicitor laid the facts before the council. Asked for an explanation by the Registrar, Dr. Gunn had replied that he had been very ill at the time of signing the statements. He quoted the warning notice, the words of which were used in the charge.

Dr. J. R. Bulman testified that at a meeting of the Hereford Medical Board (of which he was chairman) on March 7, 1941, Mr. Lyward had handed to him six "certificates" relating to persons attending for medical examination. These documents were signed by Dr. Gunn but did not actually certify anything, being case-histories of mental cases, without verbs. Witness said his suspicions were aroused because the documents used expressions which he thought no ordinary medical man would use. Asked to exemplify such statements, he quoted "Lives entirely in phantasy," and "Has fetichisms." Every one of the six boys had been rejected for military service, after examination by the county psychiatrist.

Mr. Pereira pointed out that a school for neurotic boys had been evacuated to Ludlow, and Dr. Gunn, who had taken over a practice there, was called in by the headmaster, Mr. Lyward, and had been asked at the same time to attend the boys, all of whom had been sent to the school by well-known psychiatrists. Later, when he was ill in bed, he had received an urgent letter asking him for a résumé of the histories for the use of the board, before which the boys had to appear at short notice. He appreciated now that he should not have put his name to these histories in the way he had, though he had never intended to imply that the statements were of his own observation of cases.

Dr. Gunn testified on his own behalf, confirming his counsel's statements, and put in medical certificates as to his state of health at the time. His name was not erased.

* * *

The case of *Israel David Black*, registered as of 649, Leeds Road, Bradford, M.B. Leeds (1926), who had been summoned to appear before the council on the following charge:

That being a registered medical practitioner you signed and issued the following certificates:—

(1) Tel. No. 5276. 649 Leeds Rd., Bradford.
D. Black, M.B., Ch.B. *Feb.* 7, 1941.
I hereby certify that Ronald Hindle residing at 30 Long St. Bfd., is suffering from chill and is unable to attend School. D. BLACK.

(2) MEDICAL CERTIFICATE
This is to certify that Ronald Hindle of 30 Long St., Bfd., attending Usher St. School, is suffering from chill and is not fit to attend School for a week. D. BLACK.

(3) Date 28/2/41 *March* 14, 1941.
I hereby certify that R. Hindle residing at 30 Long St. Bfd., is suffering from influenzal deb. and is unable to attend school. D. BLACK.

whereas you had not examined the said Ronald Hindle on any of the said three days, or at all, and he was in fact quite able to attend school on all the said three days, and such certificates were untrue, misleading, and improper.

Dr. Black was accompanied by Mr. Pereira. The council's solicitor said that the town clerk of Bradford had drawn the council's attention to this case, on the instructions of the city council. Bradford had a custom of granting compassionate leave to children whose relatives were ill; in this case no medical certificate was required. Ronald Hindle's sister was in hospital, and his mother had to look after the two grandchildren as well as her own seven and kept the boy at home to help her. On Jan. 7 a certificate for the compassionate ground was given by Dr. Black's assistant and Ronald had been granted leave until Jan. 24.

Mr. W. Margerison, superintendent of school attendance, testified to the custom at Bradford and to the facts in this case. He agreed that an officer had called at the home during the material time and found the boy out—and so presumably not ill.

Mrs. Selina Hindle testified that her daughter had been in hospital ten weeks with lobar pneumonia, and the baby had had fits. She had sent Ronald to the doctor's for medicine for the baby and a doctor's note to continue the leave of absence already granted. The assistant who had signed the first certificate was not there, and the boy had returned with document (1) in the charge. She had been to the town hall and explained the circumstances. On a second visit the boy had gone with her. She sent the boy to the surgery again for repeat certificates during the ten weeks. Dr. Black was not her doctor or her family's doctor, except only the married daughter's. She had been too busy to look at the certificates before sending them to the school. Dr. Black had sent an account last week (14*s.* for the certificates); previous to that the collector had been taking 6*d.* a week from her for 14 weeks. She knew that the usual charge for certificates was 1*s.* each but had made no protest at the size of the bill. She emphatically denied any treatment to the boy, as Dr. Black was not his, or her, doctor. She admitted having shown Dr. Black the damp cellar of her house when he called to see the daughter's baby. Ronald had been in the house at the time of the visits.

Ronald Hindle confirmed his mother's account of the facts, and added that during his school leave he had been distributing newspapers for his older brother.

Dr. Black declared that he had a large mixed general practice. He had been called to see the baby on Feb. 7 and had seen the baby, Mrs. Hindle and Ronald. He went through the house with her, saw five inches of water in the cellar and promised to report it. She said they were all getting colds and that Ronald had been coughing. He examined him and found bronchial catarrh. He sent a certificate accordingly, with the baby's medicine. At the time he had not known that Ronald had school leave on compassionate grounds. He had called to visit the baby every day until Feb. 17 and had seen Ronald every time. Ronald was fit for school on March 18; he had attended the surgery on March 21 and asked for another certificate; he denied he had been selling papers. Respondent refused a certificate. He had never seen Ronald at the surgery at any other time. The bill was given to the collector at the end of August.

Cross-examined, he said he had destroyed—as was his custom—the visiting lists, on slips of paper, from which he made up his ledger. Thus there was no contemporary evidence of his attendance. He destroyed this evidence in June or July, although he had heard of an inquiry into the case in May. It was before he heard from the G.M.C.

In reply to the Legal Assessor, he detailed the examination and treatment of Ronald. The certificate of "influenzal debility" was an error; the boy had not previously suffered from influenza.

Mr. W. Sergeant, Dr. Black's collector, testified that accounts for Mrs. Hindle and her married daughter had been handed to him about the beginning of August, and that he had called in the first week of September and seen both women, the daughter taking the accounts and paying an instalment on her own. After that he had called weekly and got sums on both accounts each week. Neither had ever protested about the amount. He explained the system of accounting in detail.

The council did not find the charges proved.

ERASURE FOR ADULTERY

The case of *Eric Dickens Spackman*, registered as of 46, Shelley Road, Worthing, M.R.C.S. (1917), who had been summoned to appear before the council as a result of the divorce decree in the case of Pepper *v.* Pepper (Spackman cited), dated Feb. 3, 1941, he having stood in professional relationship with Mrs. Pepper at all material times. Respondent was represented by Mr. O. Hempson, and gave evidence on his own behalf, strenuously denying any adultery. Strong testimonials to character and a petition signed by over 500 patients were put in, but the council directed the registrar to erase Mr. Spackman's name.

Mr. T. E. A. Stowell, F.R.C.S., and Dr. D. A. Coles have been re-elected to the council of the Industrial Welfare Society.

Sir Harold Gillies has visited America as the guest of the Academy of Ophthalmology and Otolaryngology to attend their meeting in Chicago on Oct. 19 and 23, and he spoke at a special defence programme meeting held by the academy. Dr. R. D. Gillespie is visiting America at the request of the New York Academy of Medicine to deliver Salmon memorial lectures. He has chosen as his subject psychoneuroses from the standpoint of war experience. Dr. Gillespie will also give addresses at Chicago, Toronto, and San Francisco.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE officer with the long gloomy face settled down in his corner and regarded me with the perseverance of one who has a story to tell. No wedding guest, I was yet sufficiently susceptible to the power of the human eye to give in, and soon the preliminaries were over and the man was retailing information likely to be of service to the enemy. I hasten to pass it on, an example of careless talk. It's a long run from the West Country to London, and I daresay we hadn't got much beyond Exeter before I knew he was attached to a blood depot—a doctor, of course, one of the pessimistic kind. It seems they are bothered by vampires. "They get in at night you know," he said; his voice was mournful and sincere. "Bats and so on; you know how it is with vampires." I said I knew my Bram Stoker as well as the next woman. "Just so," he answered sadly, "we have been warned. Vampires in these days should be child's play. The whole thing has been thoroughly worked out: symptoms of infestation, course of illness, autopsy findings, treatment, methods of defestation, all the rest of it. Plenty of well-authenticated case-histories; nice statistics. Child's play." He ruminated. "We haven't had any bad epidemics in England, either, up to now. They're endemic in Styria, of course; or what used to be Styria," he appended with the caution of a generation which has never had a chance to roll up the map of Europe. "But we've been exceptionally lucky over here. Vampires and trichiniasis run about parallel." I complimented him on our gratifying immunity. "They're on the increase though," he answered darkly. "Bound to be. You've got to remember that everyone dying of vampiric anæmia (it's ordinary microcytic anæmia of course, but the term's convenient: Israëls suggested it) everyone dying of it becomes a vampire too. So they're naturally very much on the increase." "But surely you could get rid of them," I demurred, and I muttered something about wild garlic and stakes, which reminded me so keenly of a pre-war luncheon that my attention wandered to my stomach for a time. When I came back into circulation he had digressed into a short lecture on vampire therapy.

". . . much simpler ways nowadays," he was saying, "though I won't deny the old measures were pretty effective. However, it meant a lot of field work, and the apparatus cost a bit. Then locating the tombs always took some time; in fact in a badly infested neighbourhood you really needed two or three first-class vampire teams in the public health service constantly on the go, and of course the local authorities made trouble about the expense. Short-sighted," he ended bitterly, and brooded for a while. But presently he brightened up to say that nowadays they were getting encouraging results with sulphathiazole. "Really?" I asked. "How do you apply it?" "Oh to the vampire, you know, directly to the vampire," he answered briskly. "Not to the patient?" I ventured. He shook his head. "Contra-indicated," he said, "because of the anæmia. No, we sprinkle it—or better still insufflate it—directly on to the vampire." A cloud crossed his already overcast face. "Of course you first have to catch your vampire," he conceded; and went on dejectedly, "Hair brushes and things like that are no good. Nor are nets over the windows or bird-lime; we've tried them all. They dematerialise, you know, vampires do." I admitted that this property of vampires had escaped my memory. "Oh yes," he said, "they dematerialise, Makes it very awkward. Come in like a bat and go out like a candle." I said it reminded me of the month of March. "We've even tried fitting the windows with Berkefeld filters," he replied, unheeding, "—no good at all." I asked how it had begun. At first, he said, it hadn't been too bad; there had only been one vampire to start with, a reasonably considerate creature who attacked the stored blood by applying itself to a glass tube and imbibing as through a straw. "Quite clean and orderly. Probably a doctor in his time, or anyhow a lab man." But later the founder had brought in a friend and soon the depot had become a club for all the undead in the region, many of whom it seemed were bats of a different colour.

"I can't give you details," he said, belatedly coy, "but the truth is those gatherings simply became orgies. There's no other word. They took to knocking the tops off the bottles." His face wore the pained expression of a man who is accountable for stores. "They even took to plasma: simply lapped it up. And—you won't let this go any further, of course, because I've no proof and one likes to be fair—but it's my belief they're using the dried plasma like 'snow'—sniffing it." His long shocked face peered into mine, and my round shocked face peered back. Any of his colleagues from the depot would have given us a transfusion on sight. "Things are getting worse, too," he said, sinking his voice. "I simply can't tell you what it was like on Walpurgis night. All the riff-raff in, and bottles going off like machine guns. You couldn't go in there—they'd have made a dead set at your external jugular." I said imagination fairly boggled, and he agreed it did. "And there's New Year's night coming on," he pointed out. "Some of them are bound to be Scots." We thought about it silently. Bottled Scots bats. Bats wha hae Bill Wallace bled. It was likely to be quite a night "Then there's the medicolegal side," he remarked abruptly. "If they were attacking patients it would be different, but as it is we don't quite know where we stand. Are they really a medical problem at all, or are they breaking and entering, and should we charge them as burglars? It's a nice point." It was, and I was relieved when the attendant put his head in and summoned me to lunch; after all he must solve his own medicolegal problems and bottle up his own bats. Life is like that. But he sent me out shuddering all the same.

"I sometimes wonder," he said, leaning over impressively, "whether there are fifth columnists among them." My, that makes you think.

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On y revient toujours, the subject of examinations and the inferences that may be drawn from results, with inevitable criticisms of the curriculum and the rationale of medical education. Evidence too should be forthcoming of the influence of war-time conditions, and possible contributions supplied to post-bellum reconstruction. We have from time to time received stout assurances from some enthusiasts who, so far from just conceding that they are making the best of a bad job actually maintain that they are better off than ever and would prefer the perpetuation of present-day dispersal and other arrangements when we return to security and peace. Doubtless there is always a tendency to see what you expect to see. There may in some cases have been exceptional opportunities for instruction, but judging by the general standard of examinees I am persuaded that the material presented bears the hall-mark of education acquired by long application to textbooks and of deficient clinical instruction. They know all about minute difference in the varieties of leucocytes, they are very glib with the figures of biochemical problems, but they are reluctant to assess the significance of a cardiac murmur until they are provided with a radiogram and an electrocardiographic report; and a baby's belly-ache is associated in their minds with an obscure "abdominal catastrophe" (they always spell it "catastrophy"). And this is precisely what I should have expected. It is the seniors on whom we should rely for the teaching of fundamentals. The brilliant young men of the registrar class are all very well to expound to postgraduates, but maturity and experience are indispensable for instruction of the elementary student. And with these are bound up an unanalysable quality of atmosphere, of personality (to use a question-begging term), which puts it over. It would not be surprising if the seniors are flagging. Their ranks have been depleted of the more vigorous members by the claims of the Services. Those who are left are weary, bored and disheartened. They were thrown out of their stride by the other Great War and now after the long hard effort in building up a career find themselves very much as they were twenty years ago. They had hoped for comparative leisure, for cakes and ale, and find the return to a struggle to obtain dry bread and an occasional pat of butter ill suited to their years and inclinations. They can't help asking themselves to what have they to look forward? To sow for others to reap? Well, they are not strangers to philanthropy to the eleemosynary casting of bread, to professiona

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radition. They have practised these virtues for 20 r 30 years and the sentiment is wearing thin.

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Your peripatetic's note on stillbirths (disposals of) mphasises what scope for ingenuity lies in this direction. mong midder-boys in the East End a convenient nethod of disposing of the body is (or was) to wrap it up n a neat parcel and take a taxi to a point near to the ospital. This was to establish an alibi. The parcel ould then either be taken out and handed over to the ost-mortem department, or, better, left behind for the axi-driver to discover later and explain away to his wife. ne has heard it said that float-fishing in the Seine used o be ruined by the fact that during an average day's ngling the catch included rather more fœtuses than fish, ut this may be an exaggeration. A method which may ppeal to the maliciously minded is to choose a railway erminus against which one bears a grudge, hand in the arcel containing fœtus to the left-luggage office, and mit to call for it. In the country the problem is less ressing than in the town. In my experience there is othing to beat a rabbit hole. I remember once dispos- ng in this way of the products of a miscarriage—no, it asn't a criminal abortion—and I confess to having felt ertain qualms when I observed a great mongrel that I wned at the time, who was always hungry and dusty in he sunshine, eyeing the hole later. Hens, by the way, eem very grateful for placentæ in these hard times.

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Why is it that so many medical men feel obliged to adopt the tone of a muscular curate when writing for the ordinary public on sex? I am told by Dr. John Drew, in his Pelican "Man, Microbe and Malady," that the 'sex instinct is one of the strongest, and can be one of the most ennobling, of human instincts." In almost the same words a well-meaning clerical schoolmaster closed an unsought (and unnecessary) interview given to me in adolescence. Despite the undoubted truth of the statement, the effect of such a bromide can only be either soporific or irritating, according to the mood of the reader. Other phrases of Dr. Drew's, such as "clean and upright lives," and his description of congenital syphilis as "the atonement made by the innocent child for the sin of the parent" have likewise a clerical rather than medical ring. Aldous Huxley once said that the research worker was the modern equivalent of the medieval monk, and on the whole this is probably a flattering comparison. There is, however, little in common between the curate of today and the medieval churchman, and it would be a pleasant change if doctors writing on sex paid some attention to a precedent laid down by the most famous of medical monks, Rabelais.

In my experience the majority of scientists outside the laboratory are a confirmed set of old women, but most people tend to think of them as cold and inhuman. In the laboratory their assessment of values probably is logical rather than human. Dr. Drew, despite his fondness for the "human touch," is not altogether free from this. The common cold, for instance, is not for him just an infernal nuisance to millions of individuals but is "responsible for an enormous loss of individual and national efficiency, and for severe industrial dislocation and economic loss." Again the ravages of malaria are "estimated at 2,000,000 people annually, an annual economic loss to the British Empire alone of from fifty to sixty million pounds." Human loss cannot be assessed in terms of pounds, shillings and pence, and such estimates may be the first stage of an insidious process. Its culmination finds expression in such a phrase as I heard spoken on a bus by a Homburg-hatted person after one of the spring blitzes—"It is terrible, terrible! Think of the millions of pounds worth of damage." Something is very wrong when property and pelf are considered more important than people. I do not suggest that Dr. Drew thinks this, but the tendency is one that doctors should guard against.

BRITISH ORTHOPÆDIC ASSOCIATION.—The annual general meeting of this society will take place at Oxford on Jan 2 and 3. The scientific sessions will be held in the department of human anatomy at 9.30 A.M. on both days. Prof. T. P. McMurray will give his presidential address, on conservatism in orthopædic surgery, and Prof. Philip Wilson, of New York, will read a paper on arthroplasty.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

THE House of Commons is now discussing a general mobilisation of the nation's man-power and woman-power which, if we were a quick thinking people, we should have done before war was declared in 1939. But we are not quick thinking or quick acting. We are slow, our social organisation is heavy with a great weight of inertia.

How "sure" are we in our debates, and because of this sureness of our position how tolerant. The whole House spent a day debating an anti-war amendment to the address proposed by Mr. Maxton's party of three. And two days before that it had listened to Dr. Salter opposing the war on the ground that it was a betrayal of Christ. Dr. Salter was seriously ill some time ago and began his speech by saying that this was "probably almost the last occasion on which I shall have the opportunity of addressing this House," but rose to oppose the present war and everything connected with it. Dr. Salter estimated that one in twenty of the population was against the war, he also quoted the Cardinal Archbishop of Ireland's demand for a negotiated peace, and ended, "Will not somebody, for the love of God, for the sake of Christ, demand sanity and peace? Must the war continue by its own inherent momentum until the final crash ends in prolonged anarchy and social confusion?" But the member who followed him, while paying tribute to Dr. Salter's sincerity—the sincerity of the Christian martyrs—went on blandly to discuss the Government's lack of a "wages policy." Sir George Schuster brought the debate to a high level in a carefully reasoned appeal linked with constructive proposals to make "equality of sacrifice" and "equality of service" business realities. The present mongrel system of profit-making and service-giving was injuring the war effort—over the door of every business there should be a notice saying, "This business for the duration of the war is being run on account of the Government." Many debates, perhaps, on the Address are ragged and inconsequential because anything can be raised and everything, practically speaking, is in order. Sir Roger Keys spoke soon after Sir George Schuster about the termination of his appointment in charge of the Commandos, while the next speaker talked about our relations with the United States and the need of a great British export trade after the war. Colonel Wedgwood spoke of the Zionist offer to provide Jewish troops. And so the debate went on—not a debate in any narrow sense, but a firing of argumentative broadsides at the Government. Mr. Greenwood, who tidied up the discussion in his reply for the Government, could not of course do more than say that the matters raised would receive attention, and promise that the Government would give facilities for a debate on any aspect of the Home Front it was desired by the House to discuss.

* * *

The 18B debate was a debate over a clearly limited field and was in the nature of a critical attack on the Hon. Herbert Morrison, the home secretary. The amendment expressed the grave concern of the House "at the abolition of any judicial safeguard for the liberty of the subject against the arbitrary acts of the Executive." Sir Irving Albery, the mover of the amendment, was backed by a large number of signatures. The uneasiness felt in the House was expressed also by Commander Southby, the member for Epsom, and to some extent by Mr. Pethick-Lawrence and many others. Mr. Morrison's case was that most of the detainees were either of enemy origin or members of the British Union of Fascists, that a large number of cases which had appealed to the advisory committee had been released, and that the number of detainees other than those mentioned was small. Mr. Morrison's method of defence in the past has been to attack. In this debate he parried attack with gentle riposte and the House approved his defence of 18B without a division.

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Despite Government successes however a clear indication is emerging of the formation of opposition opinion.

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There are several oppositions—there is no destructive opposition. But that a constructive opposition will emerge is probably only a question of time.

FROM THE PRESS GALLERY

Women's War Work

APART from sidelights on sartorial refinements such as uniforms for munition-workers and motley for the noble lords on the cross benches, some useful points emerged from the debate on women's war work in the House of Lords on Nov. 25. Lord TRENCHARD was especially concerned with conditions in the Auxiliary Territorial Service which he thought had never had a fair chance. On its inception in 1938 it had been run by very junior Army officers and even now there was still too much masculine interference with discipline and training. He was old-fashioned enough to dislike seeing a woman doing a man's work even in these hard times, and he was not sure that parents approved of the A.T.S. working with men in small units scattered about the country. He thought there was a lot to be said for retaining some older women as officers. Lord SAMUEL spoke of the general call-up of women. He thought the experience and ability of interviewers had often been to seek and that there was a lack of uniformity in the standards of the medical examinations. He deplored the long hours worked by women in some factories. There were still many complaints of the inadequacy of canteens and an insufficiency of day nurseries. More welfare officers were needed in industry, or many evils, though recognised as evils, would still continue. If women were to be conscripted good use must be made of them. Lord STRABOLGI thought a tremendous lot depended on whether Mr. Bevin or Dr. Ley won the race in mobilising married women for the factories. To this end the provision of day nurseries was crucial and urgent, yet the Ministry of Health was moving in a ponderous, peace-time, bureaucratic way. Lord CROFT, who replied for the Government, declared that the War Office was not prepared to treat women as though they were tough soldiers nor as though they were a women's university in time of peace. But the approved scale of accommodation for women was decidedly better than for the men. They tried to keep women's units separate from the men's, but as in many other walks of life it was not always possible. All the A.T.S. units were now commanded by women and when women are trained for staff duties they would be used. Till then the final responsibility must rest with the Service. Lord SWINTON made a plea to give women the minimum of man-made drill and the maximum of training by women for the jobs they would have to do. Lord TRENCHARD was doubtful whether Lord Croft had given an assurance that women were to run their own services. Lord Croft seemed to infer that there were not enough women trained to run their services, but were there any men trained to do the work of training women?

Uneasiness about recruitment to the A.T.S. was also reflected in the debate on the Address in the Commons. Captain J. H. F. MCEWEN thought the problem was feline not ovine. It was useless for the Minister of Labour to go about the country bellowing like a wounded rhinoceros, threatening conscription and appealing to women's sense of adventure, for most women only wanted security. Captain McEwen was sorry the glamour recruiting poster had been withdrawn, it was the only theme which would attract many women. Mr. C. STEPHEN agreed that women wanted security rather than adventure, but suggested offering them the more rational baits of social equality and equal compensation and pensions with men.

Incidence of Tuberculosis

Mrs. J. L. ADAMSON asked the Minister of Health whether, in the inquiry by the M.R.C. into the causes of the increase of tuberculosis in girls and women of 15–30 years of age, he would ascertain the nature of their occupations, and if the increase was revealed as a result of medical examination not normally undertaken in peace time. Mr. E. BROWN replied: I understand that the M.R.C., in the course of their inquiry, will consider such evidence as is available as to how far occupational circumstances have a bearing on this problem. The trend of tuberculosis has been revealed by information compiled by the Registrar-General in the normal way.

QUESTION TIME

National Wheatmeal Flour

Sir ERNEST GRAHAM-LITTLE asked the parliamentary secretary to the Ministry of Food what machinery existed for the dissemination and enforcement of the statutory order defining national wheatmeal flour; whether he was aware that notwithstanding this order national wheatmeal flour of 85% extraction might consist merely of white straight-run flour with added bran; and whether this composition accorded with the specification furnished by the Medical Research Council in its second memorandum, published in the spring of 1941.—Major G. LLOYD GEORGE replied: National wheatmeal is made by controlled flour millers, and, in the manufacture of this product, they are bound by the statutory order defining national wheatmeal and also by the more precise instructions regarding its manufacture which were issued to secure adherence to the recommendations of the Medical Research Council. The Minister has the necessary powers to secure compliance with such orders and instruction. A composition consisting of white straight-run flour with added bran would not accord with the specification of the M.R.C., nor would it be in accordance with the manufacturing instructions issued to millers.

Control of Disease in Dairy Cattle

Mr. M. P. PRICE asked the Minister of Agriculture what steps had been taken to set up a scheme for the regular inspection of dairy cattle by voluntary arrangements with farmers for the elimination of contagious abortion, mastitis and Johne's disease; and for the provision of serum at special rates for this purpose.—Mr. R. S. HUDSON replied: The arrangements for a voluntary scheme for the control of certain of the major diseases of dairy cattle are in an advanced stage of preparation, but difficulties in connexion with the choice of the most suitable contagious-abortion vaccine have somewhat delayed its inception. I hope, however, that this difficulty will shortly be resolved.

Weybridge Tuberculin Test

Major E. G. R. LLOYD asked the Minister whether, in view of the experience of Scottish and English herd owners with the Weybridge tuberculin test and the lack of confidence felt in the test by the industry, he would consider discontinuing the use of the recently introduced tuberculin and reverting to the type of preparation formerly used pending further scientific investigation; and whether he would consider the advisability of arranging a conference between representatives of Scottish and English herd interests and veterinary medical associations to discuss this matter in the light of their respective experiences.—Mr. HUDSON replied: The whole question of tuberculin and the tuberculin test has for some time been under investigation by the joint tuberculosis committee of the Agricultural Research Council and the M.R.C., and I propose to await the findings of that committee before taking any fresh step in the matter.

Children of Women Workers

Mr. GORDON MACDONALD asked the President of the Board of Education what steps he was taking to safeguard the health of school-children whose mothers were employed on war work.—Mr. R. A. BUTLER replied: I have asked local education authorities to give particular attention to the need of providing meals for school-children whose mothers are employed on war work.

Mr. K. LINDSAY asked the minister whether he would give a 100% grant to local education authorities who wished to stimulate nursery provision for children under five.—Mr. BUTLER replied: It has been decided that where new nursery classes are provided in public elementary school premises, especially to meet the needs of the children of women war workers, the authorities' expenditure will be eligible for 100% grant from the Ministry of Health as expenditure on war-time nurseries.

Out of the Mouths of Babes

Mr. D. L. LIPSON asked the parliamentary secretary to the Ministry of Food if he was aware that patent baby foods were being consumed by adults seeking a substitute for milk; and as the supply of baby food was limited, would he take steps to see that it was reserved for those for whom it was intended.—Major LLOYD GEORGE replied: Patent baby foods are not controlled by the Ministry of Food, but an infant food manufacturers group has been formed after consultations between the ministry and the trade. Inquiries have recently been made into the allegation that such baby foods are being

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purchased and consumed by adults seeking a substitute for liquid milk. These inquiries showed that every effort was being made by the trade to restrict sales to customers purchasing the foods for infant-feeding, and considerable publicity has been given to the subject in the appropriate trade paper.

Central Medical War Committee

Although the full Central Medical War Committee has only met twice in the year ended Sept. 30, its work has been carried on continuously by its appropriate subcommittees and by its officers in accordance with the authority which it has entrusted to them. (Mr. BROWN replying to Mr. T. E. GROVES.)

Medical History of Pension Claimants

Mr. C. STEPHEN asked the Minister of Pensions whether he would take steps to arrange for a medical board or medical referee in each case where there was a conflict of opinion between the panel doctor of an applicant for pension, who was acquainted with the applicant's medical history and his medical advisers, who were responsible for the rejection of the claim, to consult personally with the panel doctor and the minister's advisers, with power to recommend the grant of a pension and to avoid injustice being done to applicants for pension.—Sir W. WOMERSLEY replied: It is the practice of my medical advisers to give full consideration to any opinion expressed by a man's doctor in conjunction with the evidence in the possession of the ministry. Where there is a conflict of opinion and serious doubt obtains I seek the advice of an independent medical expert nominated by the president of the Royal College of Physicians or of the Royal College of Surgeons. All the evidence, including the opinion expressed by the man's doctor, is placed before this independent expert whose medical opinion I always accept.

No War Bonus for Panel Practitioners

Mr. GROVES asked the Minister of Health whether his attention had been called to the resolutions passed by the Doncaster and Kent panel committees, supporting the appeal for a war bonus of 4*s.* to insurance practitioners; and whether he would consider this matter.—Mr. E. BROWN replied: I have received copies of these resolutions, but I cannot see my way to grant such a bonus.

No Smallpox in the Army

In reply to a question, Captain H. D. R. MARGESSON said that no cases of smallpox have been reported in the Army since the outbreak of war.

Army School of Hygiene

Mr. W. J. THORNE asked the Minister how many civilian doctors had passed through an Army school of hygiene course; and how many had taken courses for treating mechanical warfare casualties.—Captain MARGESSON replied: I understand that the courses referred to are those given to civilian doctors on entering the Army Medical Service. Some 5000 medical officers have passed through a course at the Army School of Hygiene and over 1000 through a course for the treatment of mechanical warfare casualties.

Public Health

From the Annual Reports

HARROW

Dr. Caryl Thomas in his annual report criticises the decision of the Ministry of Health to curtail annual reports in war-time. He says: "The records of the public-health activities of a stable community will show from year to year a steady progress effected; those of a rapidly growing community may present more spectacular features, but no changes in peace-time can be of the magnitude of some of the social upheavals which have taken place in so very many districts this last year." And there is much point in this argument. Dr. Thomas also calls attention to failure by practitioners to attend to the alteration of death-certification which became effective in 1940 as the result of the international conference. The chief alteration is that formerly, when more than one cause of death appeared on the certificate, the registrar chose one for purposes of classification by an arbitrary convention. In the new order the cause which the practitioner puts first is taken for the purpose of classification. The practitioner should therefore take care to put first what he really believes killed his patient. Up to the time of writing his 1940 report there had been no appreciable shelter ill health in Harrow but Dr. Thomas fears, as we all must, that our comparative freedom from shelter disease cannot be expected to continue. We shall not know until long after the war is over whether shelters were a benefit or a mistake, but it seems clear that where air attacks on a big scale are unlikely they are generally disadvantageous. Dr. Thomas hopes that "even should raiding have more pronounced effects in this district again, the population, having once adapted themselves to spending their nights in their own homes, will continue to feel secure there," for he thinks that the "security" of shelters is mainly the mass courage of companionship.

The general death-rate of Harrow rose in 1940 from 7·1 to 9·1 crude, 11·2 corrected, and in infantile mortality from 38·5 to 50.

COUNTY PALATINE OF CHESTER

This administrative county of 622,746 acres and 767,770 persons is heavily urbanised, and all but 171,250 of the population live in boroughs or urban districts. There was a drop in notifications of tuberculosis in 1940 to 674 against 709 in 1939 and 802 in 1938; but an increase in deaths from the disease to 403 against 358 and 360 in the two preceding years. The mortality-rate of 0·52, though higher than those of the two previous years, is still low. A table of infant feeding shows that breast-feeding is slightly commoner in the urban than in the rural districts. At the end of the first month only 66% of the rural and 68% of the urban children were breast-fed and at the end of the sixth month the percentages had fallen to 48 and 47 respectively. All the rates except those for the end of the third month were lower in 1940 than in any year since 1936. A further table shows that the health of children aged 2–4 years is considerably better in those who were breast-fed than in those who were not. Infants are unfortunately often taken off the breast because they are sickly or feeble, so the difference in health may in part be due to this.

Dr. Ian Mackay, the county medical officer, comments on the increase of adulteration in foods and drugs to 9% of all samples taken, the highest on record in Cheshire. The chief increase was in watered milk. "Even the heavy fines inflicted on delinquents has not had the desired effect." The heaviest fine was £32 2*s.* including costs against a farmer who had added 55% of water to his milk. This is the highest penalty ever inflicted in Cheshire. Had it been multiplied a hundredfold and taken as a precedent it might have done something to bring to an end this most frequent and pernicious form of swindling.

There are 1105 persons on the blind register of Cheshire of whom only 6 are under five years of age. There are 413 over seventy and 844 over fifty years of age. Prevention of blindness has made good progress of recent years, but the reduction in the numbers of young blinded people is mainly due to low prevalence of diseases which threaten blindness remotely. Unpreventable causes of blindness appear to be diminishing while the preventable causes are becoming less severe and are being better treated. The total number does not, however, fall because, like everyone else, the blind are living longer.

COLCHESTER

Dr. W. F. Corfield reports an increase in the death-rate of Colchester from 9·2 in 1939 to 12·4 in 1940 and of the birth-rate from 14·6 to 15·6. The Registrar General's estimate of the population, on which the rates are based, was 46,400 against 52,550 in 1939, but "it is impossible to say how it compares with the actual population," and local birth-rates and death-rates for 1940 cannot be reliable. But infantile mortality, which is the most sensitive index of the health of populations and is independent of their age-sex composition, more than doubled, from 28·5 to 58·5, and Dr. Corfield says: "It is difficult to account for this great increase; probably war conditions have a good deal to do with it." The isolation hospital admitted 82 cases of cerebrospinal fever in 1940, but there was only one death.

Infectious Disease in England and Wales

WEEK ENDED NOV. 22

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1417; whooping-cough, 1995; diphtheria, 1082; paratyphoid, 18; typhoid, 10; measles (excluding

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rubella), 639; pneumonia (primary or influenzal), 1100; puerperal pyrexia, 142; cerebrospinal fever, 114; poliomyelitis, 13; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 209; ophthalmia neonatorum, 59. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 19 was 1321, including scarlet fever, 174; diphtheria, 286; measles, 37; whooping-cough, 487; enteritis, 37; chicken-pox, 37; erysipelas, 26; mumps, 7; poliomyelitis, 4; dysentery, 25; cerebrospinal fever, 12; puerperal sepsis, 16; enteric fevers, 35; malaria, 1; other diseases (non-infectious), 60; not yet diagnosed 77.

Deaths.—In 126 great towns there were 1 (0) deaths from enteric fevers, 3 (0) from scarlet fever, 2 (0) from measles, 9 (2) from whooping-cough, 27 (0) from diphtheria, 35 (2) from diarrhœa and enteritis under 2 years, and 25 (5) from influenza. The figures in parentheses are those for London itself.

There was 1 death from an enteric fever at York. Liverpool reported 7 fatal cases of diphtheria.

The number of stillbirths notified during the week was 192 (corresponding to a rate of 39 per thousand total births), including 13 in London.

CHILDREN IN SHELTERS

How much time should children spend in air-raid shelters? At first glance the answer would seem to be "As little as possible," but at a conference arranged by the Save the Children Fund, and held at Friends House on Nov. 29, the question was not felt to be simple. Evacuation was not discussed, because all agreed that London was not the proper place for children during a war. But there are children in London, and their welfare must be considered, for as Mr. KENNETH LINDSAY, M.P., pointed out in his opening address they are exposed not only to bombs but to anything the war may bring along. If during the winter months children are encouraged to come to the shelter in the evenings they are at least off the streets, and their parents know where they are; but of course it would be better, as most speakers agreed, if there were enough properly organised boys and girls clubs or play centres for them to attend instead.

How far, then, can the shelter be made to serve the purpose of a play centre and is it desirable that it should be used in this way? In some boroughs many parents are now sleeping at home and sending the children to the shelters to sleep; in others, where no children under 14 are allowed to sleep in the shelter without their parents, many children come to the shelter to meet their friends before going home to bed. Thus the children themselves are treating their shelter as a rendezvous. If there are no organised occupations for them they find their own amusements, which include card-playing for money and smoking. Those between 10 and 14, who feel on the brink of complete citizenship, are naturally the most prone to these adult pursuits; but in one shelter, as soon as a counter attraction in the form of aeroplane modelling was presented, the children forsook gambling to become absorbed in it. They want an occupation—one speaker said "they're like a dry sponge"—but they want the occupation to have some point to it. They would rather make Christmas decorations for the shelter than raffia mats; they would rather paint a cupboard than a picture book; they like better still to be doing something which they feel is helping the troops or the war effort; and most significant of all, they do not use the term "play centre" among themselves—they speak of the "centre" or the "club." They like going to clubs and centres because they "get the chance to make things"; and they rightly regard the word "play" as an affront. No-one would tell an artist to go and play in his studio or a carpenter to play at his bench.

If the shelters, then, are to be used as temporary and accessory centres in areas which lack sufficient provision of the kind—and most speakers agreed that shelters should take on this extra duty—they must offer the children something coöperative and responsible in the way of occupation; work for the improvement of the shelter itself, or project work giving them an insight into a trade or social service. Mr. Lindsay saw the situation as another opportunity to "cash in on the war"; and his dream of a Ministry of Childhood and Youth may begin to have a material foundation in work starting now in the shelters.

Letters to the Editor

ABOUT THE CHRISTMAS GIFT: FINAL

SIR,—Referring to my appeal on behalf of the Christmas Gifts fund of the Royal Medical Benevolent Fund, I recently received a letter from a doctor, aged 78. He and his wife, aged 72, are both beneficiaries of the fund and their joint income is £169. They have been recipients of our Christmas gifts and their letter states:—

"As Christmas approaches we think of the special gift which the Committee has so kindly sent us for several years, but would like to make a suggestion. Since we came to this little farm worker's cottage we find expenses are easier than formerly. It would, therefore, give us much pleasure if our Christmas gift this year was given instead to someone who has been bombed out of home."

Many of our beneficiaries have unfortunately suffered through enemy action. May I, through your columns, ask those of your readers who have not yet responded to my Christmas appeal to send in their contributions as soon as possible addressed "Christmas Gifts," Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, London, S.W.15.

THOS. BARLOW,
President, R.M.B.F.

WHAT'S IN THE LOAF?

SIR,—Your leader of Nov. 15 and the admirable letter from Dr. Swindells (Nov. 22) should spur the medical profession to the realisation of their ultimate responsibility as guardians of the public health for what you describe as the present "strategically bad" situation of the national wheatmeal loaf.

Recent parliamentary answers reveal that the Ministry of Food has expended during the past year over half a million sterling on its advertisements, including those of the "national wheatmeal loaf" and that notwithstanding these costly efforts at persuasion the sale of that loaf represents only about 7% of the total consumption of bread in this country. Moreover, the Parliamentary Secretary was constrained to admit that the national wheatmeal loaf now in the market is of entirely variable composition, and is impossible to obtain over wide areas of the kingdom. The rise in the mortality from tuberculosis during the past two years, indicated in several recent parliamentary answers, suggests an increasing measure of malnutrition in the community, one factor of which may be the admittedly poor nutritive value of the white loaf, which throughout the country (except for one district in Wales) apparently still consists of straight-run flour (75% extraction), deprived of the germ and without any of the "fortification" promised 18 months ago by the addition of synthetic vitamin B_1 and calcium. If the influence exercised by the milling industry, with its formidable occupation of key positions in the Ministry of Food, is the explanation of the otherwise inexplicable reluctance of that ministry to make provision for the highest possible extraction flour for the national war bread, public opinion will hardly allow the obstacle of vested interests to resist indefinitely so urgent and obvious a reform. This provision was made with success in the last war, and has been urged by practically unanimous scientific and medical opinion, strongly fortified by the statement, for which the ministry itself is responsible, that universal consumption of the wheatmeal loaf would result in the saving of one-fifth of shipping space. I submit that the medical profession should lead the revolt.

House of Commons. E. GRAHAM-LITTLE.

SURGERY FOR SYRINGOMYELIA

SIR,—In your annotation (*Lancet*, Nov. 22, p. 644) you invite neurosurgeons to give their experience of the surgical treatment of syringomyelia. Some have already done so; I summarised their findings in the Medical Annuals of 1933 (p. 471), 1936 (p. 427) and 1937 (p. 421). A. Juzelevskij in 1935 reported on 23 cases; he found that opening up of cavities in the cord only gave partial and temporary relief of symptoms, which in some cases recurred within a fortnight. He also found that the pressure of the fluid in the cavity was the same as that of the cerebrospinal fluid in the theca, so that there was no question of relieving tension. In the same year

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Henry Cohen and Sir Robert Kelly reported little value from the operation in a series of 10 cases; but in 1936 H. Frazier and S. N. Rowe recorded 8 operations on a series of 5 patients, with considerable improvement in 2. Both cases, however, relapsed after the first operation and required a second; their later history is not known. My own experience of myelotomy in 3 cases was sufficient to convince me that the operation has no permanent effect on symptoms and no curative effect on the process itself.

Manchester. GEOFFREY JEFFERSON.

CADMIUM POISONING

SIR,—The recent publication (*Chem. Age Lond.* 1941, 45, 259) of a précis of a report on 208 cases of acute poisoning resulting from the use of cadmium-plated food utensils is of interest after reference to 3 somewhat similar cases in the report of the Chief Medical Officer to the Ministry of Health for 1935 (p. 155).

Last year there were 8 cases of acute cadmium poisoning in Walthamstow.

In May, 1940, 3 adults and 5 children were found to have become acutely ill some 15 minutes after consuming "lemonade ices" prepared by freezing "lemonade" in the metal trays of a reconditioned refrigerator. All were sick and 4 had diarrhœa, but recovery was generally complete within 24 hours. The remains of the unconsumed "lemonade ices" were not available but the method of preparation was repeated. This consisted of dissolving a popular brand of lemonade crystals (consisting of citric acid and sugar) in boiling water and freezing overnight in the refrigerator. Analysis showed that the trays had been plated with cadmium on copper and that there was up to 279 p.p.m. of cadmium in solution. This roughly represented gr. 1/20 of cadmium per "ice" block. It therefore appears that this quantity of cadmium may cause somewhat severe poisoning. The refrigerator was of a well-known make but had been supplied second-hand by another firm. It had then acquired cadmium-plated copper trays not supplied originally. The supplying firm was instructed to warn all its customers of the danger of making "lemonade ice" in similar trays. The original manufacturers were naturally most anxious to investigate the matter but the supplying firm unfortunately proved non-coöperative in regard to tracing back the persons responsible for the replating of the trays with cadmium.

The quantitative toxicity of cadmium has apparently not yet been clearly established but it is sufficiently dangerous for its use to be prohibited in colouring matters for foodstuffs.

I wish to acknowledge the assistance of Mr. George Taylor, F.I.C., public analyst to the borough of Walthamstow.

Walthamstow. A. T. W. POWELL.

GRADUATION AT AN EARLIER AGE

SIR,—I would refer Dr. Rogerson, who doubts my facts, to the PEP report on British Health Services (p. 137). "In 1938 a student will not be permitted to register before 18. . . . The course cannot be completed in less than six years at some medical schools, or less than five and a half at others, and one single failure through bad luck or sickness may make the course six months or a year longer." The B.M.A. recommend another year in house jobs, prolonging the course to seven years or so.

This late age of graduation to some extent explains why out of 18,901 married doctors, according to the 1931 census, only 5·8% were married before the age of 30. This figure does not take account of those who never marry at all, so it is on the high side. Statistics show that, on the average, a wife is not more than a year younger than her husband, and as fertility in primiparæ falls rapidly after 30 it is little wonder that the doctor's nursery is almost empty.

Do specialists fare better? "A young man will hardly keep himself for the first ten years that he is in specialist practice" (p. 160). I looked up at random 50 honorary physicians and 50 surgeons at London hospitals in Who's Who 1940. Their average age was 52, and the average age on marriage was 32·6. About a quarter (24%) had no children at all, 42 had no male issue, while only 3 had five children.

With regard to an earlier start in medicine, Dr. Rogerson wants to know what intelligence is. "In so far as there is a common meaning to the word intelligence, we may say that it corresponds to *g*" according to R. Cattel, quoted with approval by Professor Spearman, the greatest authority on the subject, who says that *g* ceases to grow after 13 or 14. Conative factors, of course, are also important, and my contention is that enthusiasm for learning is less under a system where graduation is virtually at 26 and the chances of making a home by the age of 30 is only about one in twenty. Dr. Rogerson's misgivings as to whether a man at 21 can be safely given responsibility sounds strange in an age when our youth is showing such resourcefulness and leadership, as indeed they always do when given the chance.

Mr. Bates, who seems to think two blacks make a white, says we are no worse off than other professions, but it is to us that the public come for advice on size of family, and we ought to put our own house in order first. The G.M.C. have not only made biology and psychology compulsory for students, but genetics as well. Perhaps the student of tomorrow will say to the G.M.C.: "Biology tells us that the best age for parenthood is 24–32, so why may we not be encouraged to settle down by then? Psychology teaches that mental health is benefited by an emotional life appropriate to one's years, a full nursery in the thirties, and grandchildren to brighten one's declining years. I am not satisfied with a system that gives me only one chance in twenty of a home of my own at the age of 30, or if I am a specialist only forty-eight chances in a hundred of having a son to carry on my name. Surely you educationists can get together to devise a system which will give us a logical mind, a love for knowledge, and professional skill by the age of 21."

I would not, however, go so far as Mr. Bates in hinting that only communism can remedy all this. Some of our youth will always prefer a "good time" to civic responsibilities, but if the authorities would act we could have an efficient system of education which would enable those who wished to do so to start at 16, graduate at 21 and become householders by 24 or 25. Care must be taken that able men are not penalised professionally for doing so. Some such system is bound to come, and we shall hear a great deal more on the subject in the next few years, when facts force the Government to adopt some sort of population policy.

Aylesbury. A. SPENCER PATERSON.

PROBLEMS IN HÆMAGGLUTINATION

SIR,—With reference to your leading article of Oct. 25, I should like to stress the fact as I did previously (*Brit. med. J.* Nov. 23, 1940, p. 721) that the indiscriminate use of O serum or plasma is in fact not the best procedure for emergency transfusion. Individuals belonging to group O must only be considered as universal donors if whole blood is transfused. When the corpuscles are excluded and only plasma is used, O individuals are least suitable as universal donors because their plasma contains both anti-A and anti-B agglutinins. The ideal of utilising AB serum generally for this purpose cannot be attained because of the scarcity of this group. On the other hand, A plasma or serum is more suitable than O plasma or serum because it contains only anti-B agglutinins. Group A is, at least in the southern part of England, about as common as group O, so that it would not be more difficult to collect A blood than O blood. Any danger caused by agglutination of the recipient's corpuscles is then avoided if the recipient belongs to group O or A. Only about 15–18% of the population (groups B and AB) would then remain in whom the possibility of agglutination of their corpuscles by A serum would arise. Further, since anti-B agglutinins are usually weaker than anti-A agglutinins, in these cases the likelihood of damage would seem to be less than that which might result from the transfusion of O serum to A and AB individuals. Hence preference should be given to A serum (or plasma) rather than to O serum if homologous blood is not available.

The method utilised by B. L. Della Vida and S. C. Dyke (*Lancet*, 1941, 1, 564) of mixing O serum with A and B serum may not always be reliable. The amounts of A and B antigens detectable in serum are different. The serum of A_2 blood usually contains weaker A antigens than that of A_1. The full action of the iso-antigens present in serum is often only detectable by special

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physico-chemical methods. Thus the way suggested by E. Witebsky, N. C. Klendshoj and P. Swanson (*J. Amer. med. Ass.* 1941, **116**, 2654; see also *J. infect. Dis.* 1940, **67**, 188; *J. exp. Med.* 1940, **72**, 663)—namely, the addition of the purified group-specific carbohydrates to the serum—should on principle be considered an advance, though it may be difficult to obtain sufficient supplies of the purified B substance.

Finally it may be mentioned that all errors in grouping (including those originating from auto- or cold-agglutination) may be avoided by examining the corpuscles as well as the serum. In adopting this combined method some difficulties may be encountered when very many examinations are wanted in a hurry for the transfusion services. Nevertheless, it is the only way to be sure of obtaining correct results and avoiding all possibility of mistake. This is illustrated by the unusual case reported by H. J. Parish and R. G. Macfarlane (*Lancet*, Oct. 25, 1941, p. 477), in which ionised calcium played an inhibiting part against antoagglutination produced in citrated blood. For if serum or plasma is also examined against its own corpuscles, as is always desirable, such a peculiarity would be recognised immediately.

School of Pathology, Trinity College, Dublin. H. SACHS.

LOCAL APPLICATION OF SULPHONAMIDES

SIR,—One secret of success in sulphonamide therapy is to give as much of the drug as the patient can tolerate in the first few days. Where the infection is a local one and accessible more use should, I feel, be made of local application, for this will produce an effective concentration of the drug where it is wanted more rapidly than oral or parenteral administration and will not produce the same nausea. For instance, when treating a local infection of the nasal cavity a well-powdered tablet may be inserted into the nostril. It is surprising, too, that local application has not been more freely used in treating gonorrhœa. The passage of instruments through an acutely inflamed passage is contra-indicated, but the manufacturers might consider supplying sulphapyridine or one of the allied compounds in the form of slightly pliable rods, up to 3 in. long, to be inserted into the urethra once the acute stage has subsided and left in position until the patient passes his urine. More local application should result in a considerable saving in drugs, an important consideration where expensive remedies are employed on a large scale, as among native communities.

Durban, South Africa. F. GORDON CAWSTON.

GERMAN BLOOD SUBSTITUTE

SIR,—In your annotation of Nov. 1 (p. 533) you refer to a crystalloid solution named Tutofusin which is used as a blood substitute in Germany, but the composition of which is not mentioned in the article you cite. Tutofusin has been manufactured for about eight years by J. Pfrimmer and Co. of Nürnberg. According to the announcements of that firm it consists of "several serum salts," and has been employed both for intravenous infusion and also as a base for local anæsthetics.

Cambridge. G. BROCK.

ENURESIS

SIR,—The number of letters on the treatment of enuresis seems to indicate that this condition is still difficult to cure. The method which I follow—faradism to the perinæum—is almost invariably successful. I saw it described first in a French textbook of surgery about 18 years ago. The writer stated that it acted by stimulating the perinæal muscles and was successful in over 50% of cases. I had much more success with it than that but soon came to the conclusion from watching the reactions of the patients and seeing the varying times it took to cure them that it acted by influencing the child's subconscious mind. It is described in the Index of Treatment by Sir Robert Hutchison who says that being painful it is hardly to be distinguished from punishment. With this I cannot agree. I have heard of boys who have gone all through their public school wetting the bed every night. A major operation which would cure the horrible habit would be welcomed and why should a course of faradism be regarded differently? There are certain conditions which must be fulfilled if success is to be obtained:

1. The child must be of an age when it can realise that bedwetting is a horrid business, and can understand that the treatment although painful is in no way regarded as a punishment but is used as the only certain method of cure.

2. The parents must coöperate. If the child is an only one and much spoiled this sometimes presents a difficulty but the arguments used above usually convince them that it is necessary. It failed in one case whose mother said, "poor little thing, he can't help it; I do it myself sometimes and so does my husband."

3. The treatment must be given by someone who will be kind and very firm, preferably a nurse of some standing with experience of electrotherapeutic methods.

The treatment is given before the patient goes to bed, and patient, parent and nurse must understand that as inevitably as night follows day so will faradism to the perinæum follow bedwetting on the previous night. A few treatments are generally sufficient but if not the strength of the current is increased until it becomes decidedly unpleasant. There seems no limit to the age at which this will succeed. I have cured one youth of 18, but I should not care to try it on children of 3 or 4. That is to say it is suitable for the really difficult cases and it is in the hope of helping these that I write this letter.

F.R.C.S.

THE DISCHARGING EAR

SIR,—No-one can accuse Mr. Layton of lack of versatility or obscurantism, but it is surprising that in discussing otitis media and the discharging ear in his lecture "Medicine and Duty" he makes no mention of treatment with a quartz applicator attached to the Kromayer mercury-vapour lamp. Unfortunately patients with discharging ears are only referred to the practitioner of physical medicine after years of treatment with ear-drops, &c. I am convinced that many of the complications could be avoided if physical treatment was adopted from the first rather than as a last resort. Treatment with the Kromayer lamp should be combined with local infrared irradiation, which acts as a superfomentation, and with general ultraviolet irradiation to raise the general powers of resistance.

Wimpole Street, W.1. W. ANNANDALE TROUP.

MORE CERTIFICATES

SIR,—Neither the peripatetic correspondent in your issue for Nov. 22 nor the general practitioner who wrote in the *Daily Telegraph* on Nov. 24 has exhausted the varieties of "bits of paper" requested in the kind of confetti practice in which we are now engaged. A small girl patient of mine has recently been a long time in plaster for congenital dislocation of the hips. On removal of the plaster the orthopædic surgeon suggested that a rocking-horse should be bought for the child to aid in rehabilitation. The parents duly went to a shop at a neighbouring town to seek a rocking-horse. They were told that it could be supplied if a medical certificate were presented. And so, solemnly, I have written out a certificate that B requires a rocking-horse.

Clynderwen, Pembrokeshire. E. ROLAND WILLIAMS.

PRISONER OF WAR.—In a recent casualty list Lieutenant J. E. Readman, M.R.C.S., R.A.M.C., was posted as prisoner of war.

MOBILE X-RAY SERVICE.—Fifteen mobile vans, fitted with X-ray equipment, have been presented to the Ministry of Health by the British Red Cross and Order of St. John of Jerusalem. They will be stationed at selected hospitals in London and the Provinces so that calls from any part of the country can be answered. It is not intended to use them for routine work but as reserve sets for an emergency caused either by raid damage or unexpected demands on a hospital's resources. The vans will have women drivers, and a radiographer will be attached to each unit, who will be appointed by the hospital at which the unit is stationed, and who will work there while not engaged with the unit.

Each van generates its own current for the X-ray apparatus, which can be operated by cable up to 100 yd. away, and has a dark room with films and developer.

The Ministry of Health is anxious that full use should be made of these units, and application should be made to the hospital officer, or in the London sectors to the group officer.

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Medical News

University of Oxford

On Nov. 22 the degree of B.M. was conferred in absence on T. A. M. Johns.

University of London

Sir Ernest Graham-Little has been re-elected chairman of the council for external students for 1941–42.

University of Wales

At recent examinations for the degrees of M.B. and B.Ch. the following were successful :—

Obstetrics and Gynæcology.—H. J. Houghton, Dorothy M. Hyde, Tessie Phillips, Annie M. Rees, Dilys M. Rees, Dorothy Roberts, D. G. H. Tutton, A. K. Toufeeq and S. E. Williams.

Prophit Tuberculosis Survey

The Royal College of Physicians of London proposes to appoint a scholar to conduct this survey into the incidence and progress of tuberculosis. The appointment will be at the rate of £350–500 per annum, and special experience of tuberculosis is not essential. Further particulars will be found in our advertisement columns.

Czech Medical Examinations

At the request of the Czechoslovak Minister of the Interior and Education in London, the examining board in England of the Royal Colleges has undertaken to conduct a special final examination (second and third rigorosa) for the Czechoslovak MUDr. degrees. Part I (pathology and bacteriology) was held in London last week, when twelve candidates were examined. The following were successful :—

Artur Flach, Jan Glaser, Zdenek Pfeifer, Karel Skopek, K. J. Susat, Walter Tausig, Josef Voracek and Josefina Liebsteinova.

Society of Apothecaries of London

The following, having completed the final examination, are granted the diploma of this society entitling them to practise medicine, surgery and midwifery : M. C. Hannon, Birm. ; and F. G. Leekam, St. Mary's.

National Council for Maternity and Child Welfare

Lord Dawson will take the chair at a meeting to be held under the auspices of the council at 11.30 A.M. on Dec. 10, at the Royal Institution, Albermarle Street, W.1, when Mr. Ernest Brown will give an address on the care of mother and child in war-time. Prof. Fletcher Shaw, P.R.C.O.G., will also speak.

Royal Society of Medicine

On Wednesday, Dec. 10, at 2.30 P.M., Mr. A. Lawrence Abel will give his presidential address to the section of proctology. He will speak on proctology's debt to living surgeons. On Dec. 12, at 2.30 P.M., there will be a general meeting of fellows and afterwards Sir Almroth Wright, F.R.S., will read a paper on the need for abandoning much in immunology that has been accepted as true.

Royal Society of Arts

On Tuesday, Dec. 16, at 1.45 P.M., at the house of this society in John Adam Street, Adelphi, W.C.2, Mr. Maurice Ashby, D.I.C., will address the dominions and colonies section of the society on British Empire drug production.

Seals, Salmon and Strychnine

In Scotland the depredations of seals in the salmon fisheries has been so great that the Home Secretary has had to make an exception to the prohibition of the sale of strychnine in the interests of the salmon. Now amounts of strychnine up to 4 oz. may be bought for the purpose of killing seals.

Ethical Pharmaceuticals Association

The sixth annual general meeting of this association was on Nov. 11, and the following officers were elected for 1941–42 : chairman, Mr. W. Beckley ; vice-chairman, Mr. H. R. Napp ; treasurer and secretary, Mr. F. G. W. Paige ; members of executive committee, Mr. J. Angus (Bengue and Co.), Mr. G. L. Cooper (Coates and Cooper), Mr. R. F. Edkins (Organon Laboratories), Mr. A. C. Henry (Bayer Products) and Mr. C. W. S. Taylor (Ciba).

Pharmaceutical Society of Great Britain

On Thursday, Dec. 11, at 2.30 P.M., at 17, Bloomsbury Square, W.C.1, the Harrison medal will be presented to Mr. Thomas Tickle, F.I.C., public analyst for Devon. Mr. Tickle will afterwards deliver the Harrison lecture and has chosen to speak on the influence of analytical chemistry on pharmacy.

Obituary

HENRY OWEN WEST

M.D. LOND., F.R.C.P., D.P.H.

ON Nov. 20, Dr. Henry West, medical superintendent of Queen Mary's Hospital for Children at Carshalton, died, without regaining consciousness, three days after he had been struck down by a cerebral hæmorrhage. His steadfastness, keenness and high sense of duty had raised the standard of every institution where he worked, and these qualities were associated with the religious convictions which were the background of his life. West was born in 1885, the son of the Rev. J. O. West, rector of St. Philip's, Bristol, and the eldest of a family of eleven. He came to King's College, London, in 1904 from Bristol University, where he had passed the Inter. B.Sc. He took a leading part in the Students Christian Union, was a first-class hockey player and a useful bat. For family financial reasons he had to qualify as soon as possible, and early in 1909, after becoming a L.M.S.S.A. he was appointed house-surgeon to Prof. Albert Carless. Later in the same year he took his M.B. and received senior house-appointments at the City Road Chest Hospital and at the Seamen's Hospital. In 1913, he went to Queen Mary's Hospital for Children, Carshalton, as assistant superintendent, and there his interest in children's work and tuberculosis was stimulated. Queen Mary's, under Dr. Gordon Pugh, was a recruiting-ground for tuberculosis medical officers, and West soon took up this work and became T.O. for Kent. He had taken his M.D. in 1912, and he continued to study, obtaining the M.R.C.P. in 1914 and the D.P.H. in 1916. He joined the R.A.M.C. in 1917, and during his service in Salonika he was mentioned in dispatches. But he contracted malaria and soon after his return to England was invalided out of the service.

His appointment as medical superintendent of Princess Mary's Hospital for Children at Margate enabled him to return to the work in which he was most interested—children and tuberculosis—and to start his career as a hospital administrator. During the twelve years he was there, he became an authority on non-pulmonary tuberculosis in children, and though primarily a physician he developed special skill in the treatment of surgical tuberculosis. At his next job as medical superintendent of the Archway Hospital (L.C.C.), his work as an administrator was recognised and he was soon promoted to St. Giles' Hospital, Camberwell (L.C.C.). West had long felt that the staffs of teaching hospitals did not always appreciate good work done outside their walls and that the medical schools missed opportunities of teaching in public authority hospitals. During his four years at St. Giles' he was able to establish happy relations with his own old school. Some of his staff taught at King's, physicians and surgeons regularly brought their students to St. Giles', and he recruited his resident medical officers as far as possible from King's. In 1936 West became a fellow of the Royal College of Physicians and a year later he succeeded his old chief at Carshalton.

He brought to this exacting and responsible post mature knowledge, sound judgment and a high sense of responsibility for the children under his care. He slept in his clothes at the hospital throughout the night bombing so that he could dash out at a moment's notice if anything untoward occurred, as, indeed, it often did. One night when a ward which had been damaged was being evacuated he was told someone had just noticed an unfamiliar hole in the ground. West, with extraordinary prescience, realised it was probably a delayed action bomb and proceeded feverishly to get the children out of the two adjoining blocks. Within a minute of the removal of the last child his intuition proved right. There was a terrific explosion and the two wards suffered such damage that casualties would have been inevitable had anyone been in them. He was properly proud that

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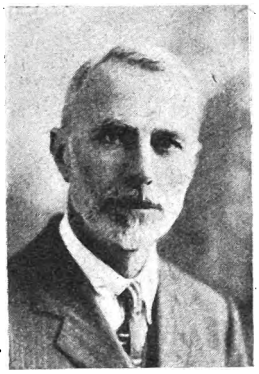
not one of his patients suffered any serious injury during the blitz.

West married Miss Anne Finchett in 1913 and they had three sons, who were all at Epsom College. Two obtained scholarships to medical schools, and the youngest is a cadet at Dartmouth.

CLAUDE CHURCHILL CHIDELL
M.B., B.S. LOND.

Dr. Claude Chidell, who died at Hythe on Nov. 18, in his 75th year, was one of the pioneers in the open-air treatment of tuberculosis. As with so many others of his time his interest in the disease arose when he became a victim to it himself soon after qualifying, and having got the better of it in Switzerland and South Africa he studied methods at Nordrach and Friedrichsheim before he was invited in 1901 to take charge of Pinewood, then newly founded by a few far-seeing philanthropists for the treatment of early cases among the educated middle classes. Here he found his métier, for his commanding presence, his sympathetic understanding of temperament, and his willingness to spend himself unstintingly, made him the ideal sanatorium chief. But the strain was too much and after four years he joined a friend who was in practice at Arosa, and later—having in 1909 married Ethel Westall, daughter of William Westall, writer and journalist—had a home of his own at Broadstairs for children with surgical tubercle. After his retirement in 1917 he settled in the Folkestone neighbourhood where he kept up his professional interests and revelled in bird and animal life as befitted a London University exhibitioner in zoology. Through growing physical debility his mind remained clear to the end.



Chidell was early left an orphan and was brought up in London by the parents of his Scots mother who was of Puritan ancestry. He was educated at University College school and hospital, qualifying in 1891 when he held house appointments at U.C.H. and Birmingham fever hospital. He wrote some useful articles on sanatorium methods but his memory is chiefly cherished in the lives of those whom he treated wisely and well.

GERIATRIC DATA.—A retired electrical engineer, still going strong at 86, has kept a careful log of his blood temperature, pulse-rate, weight and so forth twice daily for some years. He wants to know if these data would be of use to anyone.

Births, Marriages and Deaths

BIRTHS

EVANS.—On Oct. 16, at Muar, Johore, Malaya, the wife of Dr. Thomas Evans—a daughter.

HECTOR-JONES.—On Nov. 24, at Carmarthen, the wife of Captain David Hector-Jones, R.A.M.C.—a son.

HESTER.—On Nov. 25, at Harpenden, the wife of Mr. Kenneth Hester, F.R.C.S.—a son.

LEWIS.—On Nov. 13, at Moor Park, Northwood, to Dr. Greta Lewis (née Malmberg), wife of Alfred Lewis—a son.

MALINS.—On Nov. 20, at Stourport, Wors., the wife of Dr. John Malins—a daughter.

MARTIN.—On Nov. 28, at Northampton, the wife of Captain A. J. Martin, R.A.M.C.—a son.

SOUTHWELL.—On Nov. 28, at Witney, Oxon, the wife of Dr. Neville Southwell—a son.

MARRIAGES

BARRINGTON—DUNN.—On Nov. 22, in London, William Rupert Barrington, M.R.C.S., R.A.F.V.R., to Denise Elizabeth Dunn.

SCADDING—LAKE.—On Nov. 29, at Hatch End, Frank Haddow Scadding, M.D., to Helen Margaret Lake.

DEATHS

CORBETT.—On Nov. 19, at Howth, co. Dublin, William John Corbett, F.R.C.S.I., D.P.H., J.P.

NASH.—On Nov. 28, Elwin Harral Thomas Nash, M.R.C.P., D.P.H., aged 69.

TAYLOR.—On Nov. 24, at Brixham, William Taylor, M.B. Edin., of Putney, aged 86.

WILSON.—On Nov. 20, in Dublin, T. Henry Wilson, M.A. Dubl., F.R.C.P.I.

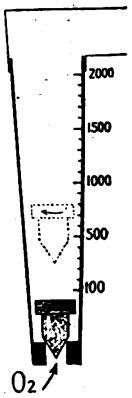
Notes, Comments and Abstracts

SICKLE-CELL ANÆMIA

SICKLE-CELL anæmia, of which a new case has recently been described,[1] is a rare hereditary disorder of the blood almost exclusively affecting negroes. It is characterised by the appearance in the blood from time to time of abnormal sickle-shaped red corpuscles, which apparently are rapidly destroyed in the body with resulting secondary anæmia. The disease occurs in attacks with remissions, and apart from the hereditary factor nothing is known of its ætiology. The diagnosis depends on the discovery of sickle-cells (drepanocytes) in the blood of the patient and of his relatives. Sometimes they are found only after preliminary treatment of the separated red corpuscles by deprivation of oxygen, an observation which suggests that they may be formed in the blood-stream rather than in the bone-marrow. The case lately reported from Cuba illustrates most of the features of the disease. A negro boy, aged 13, was admitted to hospital suffering from jaundice, enlarged liver and spleen, and mitral incompetence. Examination of his blood on two occasions showed 15% and 17% of sickle-cells and hæmoglobin values of 75% and 47%. The bone-marrow contained no sickle-cells. The blood of the patient's parents and two brothers was examined. All these people were apparently healthy, but in all except one brother the blood after treatment showed sickle-cells.

FLOWMETERS FOR GAS OR LIQUID

ROTAMETERS have for many years been used in industry but it was not until 1937 that, at the suggestion of Richard Salt, technician to the Nuffield Department of Anæsthetics, University of Oxford, they were adapted in a form suitable for anæsthetic apparatus. Since then they have been widely adopted for measuring anæsthetic gases in this country. The gas to be measured passes upwards through a specially drawn glass tube, the axis of which must be vertical. The bore of the tube is in the form of an elongated cone with its widest diameter uppermost (see figure). The range of rates of flow of the gas to be measured determines the shape of the cone. The bobbin, usually made of aluminium, has small vanes cut in its free edge. The stream of gas impinges on the vanes and causes the bobbin to rise and spin round freely on its vertical axis, thus eliminating errors due to friction of the bobbin against the walls of the glass tube. The pressure loss due to the presence of the bobbin is constant for all positions in the tube. The more the control valve is opened the higher is the bobbin forced, and the greater is the area of escape for the gas between the bobbin and the meter tube. If the tube is mounted in the truly vertical position these meters are capable of readings of great accuracy.



Rotameters are made for a wide variety of purposes and for flows ranging from 20 c.cm. of liquid or 50 c.cm. of gas up to 100 litres liquid or 1000 litres of gas per min. The makers are the Rotameter Manufacturing Co. Ltd., of Portslade, Sussex.

SUPPLIES OF ALBUCID.—British Schering Ltd. inform us that, although sulphacetamide appeared in class B of the supplement to the M.R.C. memo on economy in drugs, they are regularly supplying Albucid of British manufacture and have so far been able to meet promptly all demands for that compound.

Appointments

EWEN, EVELYN B. G., M.B. Edin., D.P.H.: asst. M.O.H. for Merton and Morden.

HALDANE, F. P., M.B. Glasg., D.P.M.: senior asst. physician at the Glasgow Royal Mental Hospital.

HODGE, R. SESSIONS, M.R.C.S.: consultant psychiatrist for Somerset.

1. Machado, O. and Arostégui, de la O. *Arch. Med. infant.* 1941, 10, 91.

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ORIGINAL ARTICLES

A GROUP OF HEAD INJURIES

JOHN E. A. O'CONNELL, M.B. LOND., F.R.C.S.
NEUROSURGEON, E.M.S.

A REVIEW of the records of 250 cases of head injury consecutively admitted to the neurosurgical unit of an E.M.S. hospital suggested that an analysis of the material might merit publication. Although the number of cases is small when contrasted with the total number of head injuries treated throughout the country during the same period, yet it is large and the material is varied when compared with peace-time standards. In addition, more benefit may be derived from the personal study of relatively small groups of cases at individual centres than from the analysis of large numbers of records by those who have themselves examined but a small proportion of the cases.

A number of the head injuries of ordinary practice are included in this series, but many more of the patients were war casualties, some wounded military evacuated from abroad and a larger number of people wounded in this country in air-raids. The centre from which this report emanates is a base hospital so that the group of patients is a selected one. A number of the most serious injuries would die before their transfer to the base could be effected, and the less severe injuries would be discharged from the hospital to which they were first admitted without ever reaching the base. Furthermore, although there is a natural tendency for patients showing complications to be transferred to the base, over 200 of the patients were admitted because of a recent head injury, and in spite of the selection it is believed that the figures have a general application.

The term head injury is here used, instead of the more cumbersome one of cranio-cerebral injury, to denote cases of injury to the brain or its coverings. Injury to the face and jaws is therefore excluded unless it be associated with evidence of trauma to the brain. The cases will be considered in two groups. First, open head injuries in which there is present either a scalp wound, a compound fracture of the skull, or actual cerebral penetration. Secondly, closed head injuries in which, although the brain is injured, its superficial coverings remain intact. The main value of such a classification is that it suggests the important fact that open injuries are associated with a risk of infection of the meninges and brain which is absent in closed injuries. The number of patients with open head injuries was 148, and with closed head injuries, 102.

Open Head Injuries

The varieties of open injury which have been dealt with were as follows.

Scalp wound	54	Cerebral penetration—	
Compound fracture of skull—		(1) uncomplicated ..	22
		(2) cerebral fungus ..	11
(1) fissured	37	(3) cerebral abscess ..	4
(2) depressed ..	20		
		Total ..	148

SCALP WOUNDS

It is perhaps not sufficiently emphasised that most scalp wounds are lacerated and not incised. It is not surprising that a force great enough to split the scalp by compressing it against the skull is often great enough to damage the underlying brain. In the table it will be seen that evidence of such cerebral injury is frequently present. Two-thirds of the patients admitted with scalp wounds were unconscious for shorter or longer periods and 15% of them showed evidence of focal cerebral damage, by which is meant such manifestations as a hemi- or mono-plegia, or an area of sensory loss of cortical type. As further evidence of the intracranial damage which may be associated with a scalp laceration may be taken the results of lumbar puncture. In only 5 of the cases was it considered necessary, but 4 of these showed definite abnormality of the cerebrospinal fluid (blood or a high protein). Had lumbar puncture been carried out as a routine there can be no doubt but that abnormality would have been detected in many other cases.

After the last war Jefferson (1919) reported signs of localised brain damage in almost a third of a group of scalp injuries which had been under his care. Many of these patients had gunshot wounds of the scalp and it seems that in such wounds the risk of brain damage is greater than in lacerated wounds. Its cause is in part the extreme violence of the injury and in part is doubtless similar to that of the paraplegia which sometimes follows the passage of a bullet close to but not through the spinal canal. More recently McKissock and Brownscombe (1941) have emphasised the frequency with which scalp wounds are associated with evidence of cerebral damage. Cairns (1941) has also drawn attention to the risk of infection spreading through the intact skull and dura from gunshot wounds of the scalp. It has of course always been recognised that any infected lesion of the scalp may lead to infection of the skull and intracranial contents. For this reason it is felt that scalp wounds can justifiably be considered under open injuries.

INCIDENCE OF NEUROLOGICAL DISTURBANCE AND FATALITY-RATES IN OPEN HEAD INJURIES

Type of injury	Total	Cerebral concussion	Evidence of focal brain damage	Deaths	Remarks on fatal cases
Scalp wound	54	36 (66%)	8 (15%)	1 (2%)	No operation. Uræmia.
Compound fracture— (*a*) fissured	37	28/30* (93%)	4 (11%)	1 (2·7%)	A severe crushing injury.
(*b*) depressed	20	11/17* (65%)	6 (30%)	0	
Cerebral penetration	37	16/28* (57%)	26 (70%)	3 (8·1%)	Two died without operation. One postoperative death from senile heart disease.

* In the remaining cases the record was insufficient to decide whether concussion was present.

In treatment the importance of adequate exploration of scalp wounds cannot be over-emphasised. This is perhaps especially true of the short wounds which may conceal a penetration of the skull or brain. It is obvious that a proper debridement of a contaminated wound can only be carried out when it is fully explored. Two of the cerebral abscesses in this series arose because what were in reality penetrating wounds of the cerebrum had been regarded as trivial scalp wounds when the patient received his early treatment at first-aid post or hospital. When a large number of casualties are suddenly admitted to a hospital in an area which has been subjected to a heavy air-raid such mistakes are understandable. But they are very serious and would be avoided if final treatment of the wound were delayed and the early treatment confined to securing hæmostasis which can be obtained by the introduction of a very few sutures after the wound has been dusted with sulphanilamide. Thorough exploration, debridement and careful suture can be delayed for many hours in such cases.

Since wide excision of the margins of a scalp wound is never necessary there is usually little difficulty in approximating the margins of the wound accurately by suture. Occasionally—for example, in tangential gunshot wounds—the injury may entail a considerable loss of scalp tissue. When such loss of tissue has occurred it will often be possible to make it good by wide mobilisation of the scalp and the sliding of a flap over the defect. Occasionally the loss of tissue may be so great that this is impossible. If the denuded outer table of the skull is allowed to form the base of an ulcer, healing will be greatly delayed, for epithelialisation can occur only over a base of healthy granulation tissue. Such a base will usually be obtained only when the outer table has sequestrated and the diploic granulation tissue is exposed. The long delay necessary to permit such sequestration can be avoided if at the time of the original operation a number of drill holes is made into the diploe of the exposed area of bone (Porter and Shedden 1922); this

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will allow of its rapid covering by granulation tissue derived from the diploe and epithelialisation of the area will thus be greatly accelerated.

COMPOUND FRACTURE OF SKULL

Although variations in the structure of the skull itself may be a factor tending towards the production of a fissured fracture in one case and a depressed fracture in another it seems certain that the manner of application of the force to the skull is the usual deciding factor. It is generally agreed that a depressed fracture results from the action of a localised force of considerable intensity such as a blow on the head with a small hard object. Such violence will produce, in very many cases, a laceration of the scalp and then a localised fracture of the skull, often with indriving of the bone fragments. A fissured fracture may result from less severe degrees of the same kind of violence but is usually the result of a force applied to a wide area of skull. As a result of this the whole skull is deformed, and when the deformation has been carried beyond the limits of the elasticity of the bone a fracture arises and tends to spread along the mechanically weakest portion of the skull—its base. Trotter's classical description has led to the general acceptance of these statements.

It might be expected that the neurological disturbance would differ in the two types of fracture, and in the table it will be seen that this is actually so. Almost all the cases of fissured skull fracture show a period of unconsciousness immediately after the receipt of the injury, whereas this was present in only two-thirds of the cases of depressed fracture. On the other hand, while fissured fracture was associated with evidence of focal damage to the brain in 8% of cases there was evidence of such damage in 30% of depressed fractures. It seems clear that fissured fractures are associated with evidence of generalised cerebral damage more often than are depressed fractures, while they are much less often associated with evidence of focal nervous disturbance.

The occurrence of a leak of cerebrospinal fluid through a skull fracture to the exterior is important because it is clear evidence of a communication between the subarachnoid space and an infected surface area. It is of interest that the fractures of the vault in this series, and therefore all the depressed fractures, were not associated with such leakage, which is not uncommon in fractures of the base of the skull. Several reasons for this difference at once suggest themselves. The dura mater at the vault of the skull is but loosely adherent to the bone; at the base the attachment is very firm. A fracture of the vault, even with considerable depression, will often not tear the dura which separates from the bone and slides beneath it; while this may not be true in children it is certainly true in adults. Any separation of a basal fissure will be at once associated with a tear in the dura, and all that is then necessary for the occurrence of a leakage of cerebrospinal fluid is an associated tear in the delicate arachnoid. No doubt the large size of the basal subarachnoid channels compared with those over the convexity of the hemisphere is another reason for the different incidence of leakage in fractures of the two types. Perhaps also gravity tends to maintain a leak at the base when it would have a contrary effect elsewhere.

There is difference of opinion as to the correct treatment of a leakage of cerebrospinal fluid after a head injury. While leakage may take place into both the nose and the ear, in the latter case it probably always ceases spontaneously. The problem is, therefore, that of treating traumatic cerebrospinal fluid rhinorrhœa. Some think that the defect through which the leak occurs should be closed by early operation in all cases—the argument being that even when the leak stops spontaneously subsequent meningitis is a definite risk. But it is difficult to see why the scar of an operative closure, even if it includes a fascial graft, should be a stronger barrier to the spread of infection than the scar resulting from natural healing. In the present series there are 4 cases of cerebrospinal rhinorrhœa. In 3 the leakage ceased spontaneously—in one patient after as long as five weeks.

In the fourth patient the leak continued for seven weeks. During this period she slowly recovered consciousness and after this had recurring attacks of meningeal irritation, in which lumbar puncture showed many polymorphonuclear leucocytes in the cerebrospinal fluid but no organisms and a sterile culture. In view of the obvious threat of meningitis an operative closure was carried out. An intradural approach was used. The opening in the dura mater clothing the posterior part of the cribriform plate was seen and covered with a graft of fascia taken from the thigh. The wound was closed after generous local application of sulphanilamide. After this operation the leakage ceased and there has been no recurrence up to the present.

A follow-up of a considerable number of these cases, some treated conservatively and some by early operation, is necessary before a definite decision can be reached as to the correct treatment of traumatic cerebrospinal rhinorrhœa in its early stage.

Two further points in the treatment of compound skull fractures may be raised. The value of chemotherapy in preventing the onset of meningitis in cases where the subarachnoid space has been opened by the injury is obvious. It has been used in a large number of cases and in all those in which there was leakage of cerebrospinal fluid, whether from nose or ear. During operations on compound depressed fractures hair and other foreign material are sometimes found between the bone and the dura mater. Adequate treatment of any compound fracture in which more than the slightest degree of depression is present, and in which the pericranium is torn, will obviously necessitate the removal of depressed fragments of bone and of underlying foreign material and the examination of the dura. Levering of fragments into position through a trephine opening placed on one side of the depression cannot allow of adequate exploration or debridement.

CEREBRAL PENETRATION

In the table the neurological disturbance which follows penetrating cerebral wounds is contrasted with that which follows other types of open head injury. It will be noted that the incidence of loss of consciousness is similar to that in depressed fractures and scalp wounds and much lower than in fissured skull fractures. On the other hand the incidence of focal cerebral damage is—as might be expected—higher than in any other group, amounting to 70%. This high figure is clearly associated with the actual passage of a missile into the brain, and the effects of this direct injury to the cerebral tissue may be permanent or transitory.

The importance of the dural envelope becomes obvious when penetrating wounds are considered. It is the final barrier to the spread of infection to the leptomeninges and brain. Moreover, in the vast majority of cases a body which penetrates the dura will also penetrate the brain, causing laceration of cerebral tissue. Such penetration will be associated with the risk of immediate focal neurological disturbance and perhaps epilepsy later. The risk of both these sequelæ is greater in penetrating wounds than in any other group of head injuries. It has already been pointed out that the dura mater is so strong that in depressed fractures of the vault of the skull it will often prevent penetration of the brain even when the depression is of considerable degree. Occasionally a foreign body which has penetrated the skull will be held up by the dura in a similar way and it is noticeable that when a foreign body such as a bomb fragment does penetrate the dura it usually passes deeply into the nervous tissue—perhaps until its passage is blocked by some more resistant tissue such as a dural septum.

Penetrating wounds will usually be associated with the presence of foreign bodies within the brain. Focal signs will in most of such cases be due to the injury done by the foreign body to nervous tissue and perhaps also to cerebral blood-vessels in its passage through the brain. Removal of the foreign bodies cannot therefore lessen any focal nervous disturbance; indeed attempts at removal of deeply placed foreign bodies may, by further damaging nervous tissue, have a contrary effect. On the other hand, the complete debridement of any wound implies the removal of all foreign material. A piece of metal or bone left in the cerebrum may lead to infection of the brain. Many examples of abscesses arising in connexion with foreign bodies are known and often in such cases symptoms do not appear for many years.

The procedure adopted in this series has been to excise the scalp wound and then the margins of the bone defect

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en bloc as described by Cushing (1918). By means of suction and irrigation through a soft rubber catheter the track is cleared of blood-clot, necrotic brain and small foreign bodies such as bone chips. If metallic foreign bodies are easily localisable and removable this is done. If not the foreign material is allowed to remain in situ and the wound closed, drainage being used or not according to the interval between receipt of the wound and the operation. It is felt that possible complications arising from retained foreign bodies can be dealt with as they arise.

In this series there were 24 patients with intracerebral foreign bodies. The foreign material was bone in 9 cases, masonry in 1 and fragments of bomb or shell in 14. In only 2 instances was the metallic body removed, but all the other foreign material was removed. This was partly because the non-metallic types of foreign body tend to be superficially placed and also because they are perhaps more liable to harbour infection, associated as they are with laceration of scalp and comminution of the skull. The wound of a bomb or shell fragment is often by comparison small and clean cut.

It will be noted that there were 11 cases of cerebral fungus. The frequency of this complication of a penetrating wound depends on several factors, among which may be mentioned a very long delay between receipt of the wound and the institution of treatment (48 hours or more), the destruction of a wide area of scalp, skull and brain in a gunshot wound of tangential type, and sometimes inadequate treatment in the early stages. When brain tissue is exposed in the floor of a wound healing can only take place by the growth of epithelium over the exposed cerebrum. This in turn can only occur when the exposed brain tissue has been replaced by healthy granulation tissue. During the time necessary for this process there is a constant tendency for progressive protrusion of the cerebral tissue through the defect in the dura mater. This tendency made cerebral fungus a much feared complication at one time but now, with modern methods of reducing intracranial pressure—posture, dehydration and lumbar puncture—and chemotherapy to combat the risk of meningeal infection, the condition can usually be readily dealt with. The 11 patients in this series all made a good recovery.

Of the patients with penetrating wounds 4 were treated for cerebral abscesses; 2 of these resulted from inadequate exploration of scalp wounds at the hospitals at which the patients had first received treatment. Here the evidence of meningeal reaction and the progression in focal neurological disturbance made the diagnosis obvious. In 2 other cases the abscess was found unexpectedly. The abscess was treated by tube drainage in each case with healing and recovery of the patient. The ease of localisation and slow development of the abscesses in the series, together with the possibility of always avoiding contamination of the meningeal spaces by instituting drainage through an area in which they were completely obliterated by scarring, probably accounts for this happy result.

Closed Head Injuries

Cerebral concussion was present in all the patients with closed head injuries—indeed it is cerebral concussion following a blow on the head which admits a patient to the group. Sometimes, of course, a blow on the head which does not produce unconsciousness produces subdural hæmorrhage and later focal neurological signs, but there has been no such case in this series. Of the 102 patients with closed head injuries, 13 present evidence of a focal lesion of the brain. Such damage was more common in the closed injuries associated with skull fracture than in those without fracture, the incidence being 29% in the former and 8% in the latter. This difference is no doubt due to the more severe injury which produces fractures.

Evidence of generalised neurological disturbance—i.e., cerebral concussion—was present in all the closed injuries and almost all the open fissured fractures, but in about two-thirds only of the scalp wounds, depressed fractures and penetrating wounds. Not only so, but the duration of unconsciousness and amnesia was on the whole greater in the closed injuries and open fissured fractures than in the other groups. Focal neurological disturbance occurred in 10–15% of scalp wounds, closed injuries and open fissured fractures; in depressed fracture its incidence rose to 30% and in cerebral penetration to 70%. These figures illustrate the difference between the more generalised deformation of the skull which produces closed injuries with cerebral concussion and the localised violence which produces cerebral penetration and depressed fracture with focal brain damage. They are in accordance with Trotter's (1932) description of the mechanism of skull fracture. In general it may be said that two distinct types of force may be responsible for a head injury—the one a strictly localised force which produces localised damage to scalp, skull and perhaps brain; the other a more generalised force which produces a generalised disturbance of nervous function. The exact method by which the latter disturbance is produced remains unsettled. In many instances injury will result from a combination of the two types of force—e.g., compression maximal at one point—and under these conditions focal and general neurological disturbance may occur together.

It is the focal damage which occurs not infrequently in depressed fractures which renders those who have had such an injury liable to develop epilepsy; the depression of the bone fragments is, like the focal cerebral damage, due to the force of the original injury. Removal of the bone fragments, at one time popular in the treatment of such cases, therefore offers little prospect of curing the epilepsy. This point is well illustrated by one of the cases in the series.

A young man was struck in the right parietal region by a fragment of incendiary bomb. He suffered no immediate ill effects and the small scalp wound received no treatment. Four days later he developed left-sided Jacksonian convulsions. General and neurological examination showed no abnormality. A skull X ray showed a depression of the inner table of the skull of 3 mm. and a metallic fragment lodged superficial to the depressed fragment. A small osteoplastic flap was turned down and the depressed fragment of skull and the foreign body removed from its deep surface. There had been no penetration but owing to its being extremely tense and non-pulsating the dura mater was opened. From beneath a dark spot on the cortex half an ounce of dark thick blood clot was evacuated. This completely relieved the tension and there has been no recurrence of the attacks.

HEADACHE AND THE POST-CONCUSSIONAL SYNDROME

While headache is a very frequent symptom in all types of head injury it is probably more frequent and more severe in the closed injuries than in any other group. Correct treatment in the early stages is of great importance since if the headache continues for many weeks after the injury cure may be exceedingly difficult. Here lumbar puncture may be of assistance both as a therapeutic measure and as a guide to treatment. Pressure estimation will show whether the headache is associated with high or low intracranial pressure and suitable postural treatment and regulation of the fluid balance can then be instituted. In many cases blood is present in the cerebrospinal fluid. It is almost certainly a factor in the production of headache and is perhaps also responsible for other symptoms. Lumbar puncture will, by removing blood, relieve these symptoms. Again, it seems certain that at least occasionally blood produces an inflammatory reaction in the meninges which may be of such intensity as to obstruct the circulation of cerebrospinal fluid and even produce a hydrocephalus some time later. Its early removal should minimise the risk of such complications.

After careful treatment of cases of head injury along lines which are now well recognised the early headache will in many cases quickly disappear. In cases in which it persists, or having cleared up recurs when the patient is subjected to the stresses of ordinary existence, the problem becomes very different. In many such cases general physical, neurological and laboratory examinations are entirely negative. Where pneumoencephalography has been carried out in cases of this type in this series it has usually shown no abnormality and has rarely had the beneficial effect on the headache which has been claimed for it. While at first sight it appeared that the post-traumatic headache of chronic type was more frequent after closed injuries, more careful examination of the figures revealed that its incidence was about the same in all types of injury when calculated on the

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basis of those patients who had lost consciousness. Approximately 20% of the patients who had been unconscious in each of the groups of closed head injury (many of these admitted months after the injury), compound fracture, and cerebral penetration showed this sequela. It seems then that one important factor predisposing to the complication is loss of consciousness, so that the syndrome of headache, vertigo, tinnitus, &c. is better named post-concussional than post-contusional.

Apart from this nothing can be said as to the ætiology of the commonly recurring symptoms of the post-concussional syndrome. There is almost certainly a lesion in the brain to account for the syndrome in some cases, but it is perhaps no more demonstrable than that of cerebral concussion itself or of "idiopathic" epilepsy. Indeed it may be even more difficult to demonstrate since electroencephalography will show abnormal electrical activity in the cortex of the epileptic brain, whereas no such change is to be found in many cases of post-concussional syndrome. Whether or not there be a lesion in the brain to account for the syndrome it does seem that constitutional factors are important in its development, for in many patients the personal and family history will show evidence of functional nervous disease.

Over 20% of the definitely selected group of closed head injuries exhibited cranial-nerve palsies. Every nerve with the exception of the eleventh was affected although the third and sixth nerves and the seventh and eighth were most commonly involved. While a longer period is required to follow up the cases it would seem that the prognosis is on the whole favourable. Certainly it seems that injury to the purely motor cranial nerves occurring in association with skull fracture is as likely to be followed by spontaneous recovery as is a radial-nerve lesion complicating a fracture of the humerus.

It has been pointed out above that 13% of the closed head injuries was associated with evidence of focal brain injury. It has also been suggested that the type of force which produces a generalised cerebral injury will often exert its maximum effect at one point—hence the origin of the local cerebral injury. This does not necessarily mean that the focal damage is in relationship with a fissured fracture (as it probably always is in depressed fractures). It is well known that the injury to the brain by contre coup may be much more severe than that beneath the skull at the point which received the direct trauma. The actual type of lesion which is responsible for the signs of focal damage will vary and on its pathology will depend the severity of the signs, their duration, the ultimate prognosis and the correct treatment of the individual patient. For example, 2 of the patients had chronic subdural hæmatomata, evacuation of which resulted in the complete disappearance of the neurological signs.

It may be well to emphasise again that this is a selected group of cases. The scalp wounds and closed injuries admitted to the neurosurgical wards were the more serious ones—the less severe injuries being admitted to general surgical wards or perhaps never evacuated to the base at all. This means that the incidence of focal nervous disturbance in both groups is higher than would be the case in an unselected group of patients. On the other hand from the point of view of mortality statistics it may again be pointed out that the severest injuries, dying within hours of the trauma, would never reach the base hospital either, so that mortality figures will tend to be too low. The mortality in the various groups of open injury is set out in the table. Of the 101 closed head injuries 63 were relatively recent injuries, the others being cases of post-concussional syndrome, &c. There were 3 deaths in these 63 cases giving a fatality-rate of 4·8%.

Summary

A consecutive series of 250 head injuries admitted to an E.M.S. neurosurgical centre is analysed.

Since many scalp wounds are lacerated and not incised there is often evidence of associated brain damage.

Scalp wounds must be adequately explored. When circumstances prevent immediate exploration the final treatment can and should be delayed until it can be carried out thoroughly.

Since wide excision of the margins of a scalp wound is never necessary its suture will usually present little difficulty. When a defect in the scalp is present it can often be closed by the mobilisation of scalp flaps. Should this be impossible drilling of the exposed outer table of the skull will promote the rapid covering of the bone by granulation tissue and thus speed epithelialisation.

Adequate debridement is important in compound depressed fractures of the skull.

Leakage of cerebrospinal fluid is not uncommon in fractures of the base of the skull but was not seen in fractures of the vault in this series. Leakage into the ear probably always ceases spontaneously. A final decision as to the correct treatment of cerebrospinal rhinorrhœa cannot be given, but in the early post-traumatic period a conservative attitude seems justifiable.

Deeply placed foreign bodies, which are usually metallic, will rarely in themselves produce symptoms or signs. Ill-advised attempts to remove them may lead to serious brain damage and permanent defect in nervous function.

Eleven patients who developed cerebral fungus all recovered. Treatment is mainly by measures designed to lower intracranial pressure.

Chemotherapy with the sulphonamides, both local and general, is of value in all open injuries.

Depressed skull fracture and cerebral penetration result from a localised impact of considerable violence, whereas other types of open and all closed fractures are more often the result of widespread force which produces a general deformation of the skull. This may explain the high incidence of focal cerebral damage, often without cerebral concussion, in the former types of injury, and the high incidence of cerebral concussion without focal cerebral damage in the latter group.

Lumbar puncture is valuable for both diagnosis and treatment in suitable cases of closed injury.

Efficient treatment in the immediate post-traumatic period may be important in preventing the post-concussional syndrome. The psychological background of the individual patient has also an important bearing on the occurrence of the syndrome.

From the experience in this series the prognosis in post-traumatic cranial-nerve paralysis seems usually to be good.

Focal signs are not uncommon in closed head injuries. Not every patient showing such signs, even when they are severe, will require operative treatment.

I wish to acknowledge my gratitude to Prof. Paterson Ross for the opportunity of investigating and treating the majority of the patients included in the series and for his help in many other ways.

REFERENCES

Cairns, H. (1941) *J. R. Army med. Cps*, **76**, 12.
Cushing, H. (1918) *Brit. med. J.*, **1**, 221.
Jefferson, G. (1919) *Brain*, **42**, 93.
McKissock, W. and Brownscombe, B. (1941) *Lancet*, **1**, 593.
Porter, C. A. and Shedden, W. M. (1922) *Boston med. surg. J.* **186**, 727.
Trotter, W. (1932) Choyce's System of Surgery, London, vol. III, p. 398.

CLOTTING AND FILTRATION OF CITRATED PLASMA

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UNFILTERED citrated plasma has proved of great value in the treatment of shock. Its disadvantage is that even with the most careful processing it sometimes becomes infected; and since sterile unfiltered plasma is naturally cloudy infection cannot be detected by observation alone—at least until the growth is very heavy. For this reason filtration has special advantages; it considerably reduces the risk of infection and leaves the material clear so that infection can readily be detected by the appearance of opalescence. Filtered plasma appears to have the same therapeutic value as unfiltered.

Unfortunately the passage of plasma through Seitz bacterial filter pads presents difficulties. Clotting is apt to occur and to limit the amount of fluid that can be passed through a filter. This clot develops sooner or later in the filtered material even when it is stored at room temperature. The change is hastened by cold, and frosty weather is usually followed by a crop of clotted samples. The mechanism of this clotting is obscure and differs from that of physiological clotting. It is discussed by

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Bushby, Buttle and Whitby (1940) who state that it is due to the crude asbestos present in all makes of bacterial filter pads; it is certainly not due to calcium derived from the pads, since the calcium content of plasma before and after filtration is almost unaltered. Bushby, Buttle and Whitby (1940) find that clotting can be diminished by frequently washing the filter pads with a solution of caustic soda (N/30) and sodium citrate. This procedure, modified by Stanbury (unpublished) is said to give a more stable plasma which remains clear for months. But even here, faint opalescence and small tags of protein material may appear and gross clotting follows in time; and it is to be expected that an unstable protein like fibrinogen would have a special tendency to denature. For these reasons it seems likely that plasma which has had its fibrinogen removed and is converted into serum would be more stable than unclotted plasma.

The difficulties of storing filtered plasma have resulted in an extensive use of filtered serum, which has the same clinical value as filtered plasma, is equally free from undesirable reactions and is much more stable. Nevertheless, filtered plasma will still have to be used; severe hæmorrhage is common in air-raid casualties and large stocks of citrated whole blood have to be available; consequently there is a steady potential supply of citrated plasma that must be salved. The ideal method of storing this material is to dry it immediately after filtration and so secure a perfectly stable product. At present, however, it is not possible to do this on a sufficiently big scale to deal with all the plasma available, and a method is still needed by which filtered citrated plasma can be converted into a product which though fluid is still quite stable.

Two methods of clotting citrated plasma have already been reported. Picken (1941) clots plasma by the addition of serum, the action apparently being ascribed to preformed thrombin present in the serum. He finds that it requires five volumes of serum to clot one of plasma. In our opinion this is not an economical method and is quite impracticable except at blood-depots where large supplies of serum are available. Clegg and Dible (1940) add calcium chloride to citrated plasma until there is a sufficient excess of calcium over citrate to cause clotting. An addition of 60 mg. per 100 c.cm. is needed and the final overall calcium content varies between 65 and 80 mg. per 100 c.cm. The method is simple and the authors state that in spite of its high calcium content the serum is non-toxic; this will doubtless be so in most cases, but on general grounds it would appear undesirable to issue material containing so much calcium if a product with a lower calcium content became available.

METHOD

The method described here combines the processes of Clegg and Dible (1940) and of Picken (1941) with an apparent economy in both calcium and serum; the one seeming to reinforce the other so that the total effect of the two combined is in excess of what might be expected from each separately. The mixtures of serum, plasma and calcium shown in table I will all clot completely. Plasma used was derived from time-expired blood prepared according to the present Medical Research Council method (1940): 100 c.cm. 3% sodium citrate, 20 c.cm. 15% glucose solution and 420 c.cm. blood.

TABLE I—CALCIUM REQUIRED TO CLOT MIXTURES OF SERUM AND PLASMA

Serum (parts)	Plasma (parts)	Calcium added	Final overall calcium
		mg. per 100 c.cm.	
2	1	9	18
1	1	15	23
1	1·5	19	27
1	2	23	31
0	1	46	53

It is not possible to state without clinical trial which of these mixtures is most suitable for use. The first four all have reasonably low calcium contents and the second and third are economical of serum. The method used by us for a mixture of 1·5 parts of plasma and 1 of serum (the third in the table) is as follows.

A concentrated solution of calcium chloride is prepared and its calcium content must be estimated either as calcium or as chloride. This solution is diluted until it contains 10 g. Ca or 27·8 g. $CaCl_2$%. A Winchester-quart bottle capped with a perforated screw top and rubber washer is then taken and two marks are made on its outside, one corresponding with the 1200 c.cm. and the other with the 2000 c.cm. level. Some glass beads and 3·8 c.cm. of the calcium chloride solution are placed in the bottle, which is capped and autoclaved. When the bottle is cold it is filled with plasma and serum, and any technique may be used which affords complete asepsis. First plasma is run in from the bottles of time-expired blood up to the 1200 c.cm. mark. Separation of plasma from cells is quite crude and may include the intermediate "buffy" layer and a proportion of erythrocytes. Next, serum is run in to the 2000 c.cm. mark. Here also separation is complete; every trace of serum is removed even at the expense of removing a number of red cells. Cellular elements (possibly platelets) present in the mixture are mainly included in the clot and they appear to aid its contraction. The contents of the Winchester having been mixed, the bottle is left inverted in a warm room (22° C.) overnight and then for two days in the cold room. After this time, a small compact clot holding most of the red cells in the mixture will be evident and the clot-free fluid which contains few erythrocytes may be separated from it almost completely.

There are some who may object to leaving the plasma-serum mixture overnight at room temperature on the grounds that the growth of bacteria will be encouraged. If an aseptic technique is followed this objection is not valid. However, if desired, it will probably suffice to leave the material in a warm room for four hours and then for several days in the cold. If this is done it is likely that a large bulky clot will form and not contract. Nevertheless, it is easy to obtain most of the fluid from the bulky clot by slinging the inverted bottle from the ceiling and allowing the fluid to drain for two or three hours from a needle thrust through the perforated cap and rubber washer. It will of course be necessary to insert a second and longer needle into the inverted bottle to provide an air-inlet. The glass beads prevent the clot from blocking the outlet needle and also strain off a proportion of free erythrocytes. When the clot-free fluid has been collected, it is strained through a tamped-down pad of Perfecta Paper pulp (a procedure in use at the Wellcome Research Institute) and then passed through a bacterial filter pad. The calcium content of the final product is about 28 mg. per 100 c.cm.

Using such an artificial serum, more than 60 c.cm. filtrate was obtained per 1 sq. cm. of pad, and filtration was still proceeding freely when the experiment was discontinued. No trace of clotting appeared in the filtrate or in the pad, and the filtrate remained bright, transparent and free from clot for over fourteen weeks in the cold room. Since cold accelerates clotting due to filtration, it may be presumed that this filtered material when stored at room temperature will remain as stable as filtered serum. That the addition of a large excess of calcium had no effect on the product is further evidence that remote clotting is unlikely.

The immediate effects of filtration on ordinary citrated plasma and on plasma-serum-calcium mixtures were as follows. The first 500 c.cm. of filtered plasma collected slowly and a clot appeared immediately; the next 100 c.cm. filtered very slowly and clotted at once; filtration then ceased owing to the presence of clot in the filter pads. In the case of fluid derived from a mixture of plasma, serum and calcium, on the other hand, 6500 c.cm. filtrate was collected quickly and without any clotting. The area of the filter pad was the same in each case—80 sq. cm.

The total calcium of the preparation just described was 28·2 mg. per 100 c.cm., which is considerably less than that of Clegg and Dible's (1940) material and is not likely to cause serious toxic effects. The material, moreover, has the advantage that it provides a stable fibrinogen-free product, and although serum has to be used in the process the therapeutic effect of this serum is added to that of the plasma. From one aspect indeed there is a saving of serum, since during the ordinary process of separation from blood-clot it is usual to remove only the cell-free upper portion of serum and to leave a fairly considerable cell-rich residue behind which is usually wasted. When, however, serum is used to clot

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plasma, the whole serum may be used including the dregs. It is also possible to manage the initial serum separation so that the large clear portion is directed into one vessel for primary filtration and storage, while the small blood-stained residue is diverted into a second vessel and used to clot a plasma and calcium-chloride mixture. A further advantage of the present method lies in the decrease of agglutinating titre resulting from mixing time-expired group O plasma with serum from groups A, B and AB. The process is certainly more complicated than the filtration of plasma in that the mixing of serum and plasma involves an extra manipulation; but once this has been accomplished filtration is simple and straightforward, whereas the standard filtration of unclotted plasma demands the frequent washing of pads to secure a reasonably stable product.

No definite figure can be given for the amount of calcium required to clot a given mixture of serum and plasma. The figure will vary with the amount of thromboplastic materials in plasma and serum and also with the relative amounts of citrate and calcium present in the plasma after storage. The decrease in prothrombin which occurs in old plasmas may call for extra calcium. On the other hand, during storage citrate and calcium may diffuse into the red cells from the plasma, whose citrate and calcium contents will fall. The amount of calcium that must be added to produce clotting will then depend on the decrease of citrate relative to that of calcium.

In view of possible variations in plasma citrate and calcium, this question was considered more fully. There is in a bottle of blood 100 c.cm. 3% citrate, 20 c.cm. 15% glucose and 420 c.cm. of blood containing about 185 c.cm. of cells and 235 c.cm. of plasma. If observations are made immediately after collection, before citrate has had time to diffuse into the erythrocytes, the 3 g. sodium citrate will be distributed between 100 c.cm. citrate, 20 c.cm. glucose and 235 c.cm. plasma—that is, 3 g. in 355 c.cm. or 845 mg. per 100 c.cm. It is known that during storage blood-cells swell owing to the entry of water and salts: if penetration of citrate is relatively less than that of water, plasma citrate will rise; if the entry is more, plasma citrate will fall.

Plasma citrate was estimated by the method of Pucher, Sherman and Vickery (1936). Hydrogen peroxide was preferred to ferrous sulphate for decolorising the potassium permanganate and several standards were set up. They consisted of stored serum to which the appropriate amounts of citrate solution were added. After twelve days' storage, ten plasmas contained 780 mg. sodium citrate per 100 c.cm., with a standard deviation of $\pm$ 55 mg. per 100 c.cm. In another experiment, two plasmas separated from a sample of blood immediately after collection contained 825 and 850 mg. sodium citrate per 100 c.cm. Ten days later, the contents were 850 and 770 mg. per 100 c.cm. Similar observations apply to calcium: serum and undiluted plasma contain about 10 mg. Ca per 100 c.cm.; 235 c.cm. plasma diluted with 120 c.cm. of citrate-glucose solution should contain 6·6 mg. Ca. The actual figures for two fresh citrated plasma were 6·6 and 6·8 mg. per 100 c.cm., for five plasmas stored between 5 and 10 days 6·8 $\pm$ 0·2 mg. per 100 c.cm., and for five plasmas stored between 11 and 16 days 6·5 $\pm$ 0·3 mg. per 100 c.cm.

It may therefore be said that such citrate and calcium as leaks into red cells during storage, in the absence of mixing and shaking, is accompanied by a more or less proportional amount of water. In agreement with this, it has been found that the amount of calcium required to clot a mixture of plasma and serum did not vary during the first twelve days of storage.

It must also be noted that clotting is a relative process depending on time and temperature. A mixture showing moderate clotting at twenty-four hours may show considerable clotting at seventy-two hours, unless it is kept in the cold, when the increase of clotting with time is very slow. If, then, a mixture of plasma and serum is kept for a longer time at room temperature, it is possible that less serum or calcium might be used than is indicated in table I. But in our experience, if clotting is not adequate after sixteen hours, subsequent change, even though considerable, is rarely complete and such fibrinogen as remains will be turned into fibrin after passage through the bacterial filter pads and show itself as a slight diffuse cloudiness or as tags of protein in the filtrate.

DISCUSSION

The figures in table I for the clotting of plasma in large vessels allow a certain margin of safety, the calcium being about 2 mg. per 100 c.cm. higher than the least experimental value found to be effective. The experiments on clotting in bulk were based on earlier work in which one ounce "flats" were used for the sake of economy. It required relatively less calcium to clot these smaller amounts of plasma, possibly because the process is hastened by the nearness of the vessel walls to all parts of the plasma. The data for clotting small amounts of plasma-serum mixtures are rather more accurate than those set out in table I and allow of theoretical consideration (table II).

A very small change in the amount of calcium added may make all the difference between slight and complete clotting. In the second experiment in table II the simple mixture of plasma and serum gave a diffuse tenuous clot; the addition of 1·5 mg. Ca per 100 c.cm. resulted in firm contraction. In the seventh experiment clotting was very incomplete with 38 mg. Ca per 100 c.cm. and quite complete with 42 mg. Clotting is considered complete when fluid removed from clot produces no more fibrin when further calcium is added.

Column 4 of table II shows total calcium, which is derived from the known calcium added and an assumed figure of 10 mg. per 100 c.cm. for the natural Ca content of serum and of 6·7 mg. per 100 c.cm. for citrated plasma—an average experimental figure. Column 6 shows the overall citrate in millimols based on the average figure of 780 mg. per 100 c.cm. for citrated plasma during the first twelve days of storage. In view of the fact that the experiments were carried out on pooled samples, the error in assigning average values for calcium and citrate are probably small, and the assumptions allow the establishment of an absolute relation between calcium and citrate. This relation is not a simple one, since clotting depends on the presence of ionised calcium. In the presence of citrate a small proportion of the calcium remains as a positively charged ion; the rest forms part of a negatively charged citrate-calcium complex (Hastings et al. 1934) which is inactive in the clotting of blood. The dissociation of calcium citrate into Ca^{++} and the inactive citrate-calcium anion may be derived from the equations of Hastings and his colleagues. The situation in plasma and serum, however, is complicated by the presence of proteins which also form complexes with calcium probably similar to those formed by citrate, and which are chiefly responsible for the un-ionised calcium of normal uncitrated plasma and serum. McLean and Hastings (1935) give data for calculating ionised calcium in the presence of protein. The following approximate equation, derived directly from those of Hastings and his colleagues enables Ca^{++} to be calculated in the presence both of citrate and protein:

$$[\text{Total calcium}] - [Ca^{++}] = \frac{[Ca]^{++} \times [\text{total citrate}]}{[Ca^{++}] + K/(\text{citrate}) \times 10^3} + \frac{[Ca^{++}] \times [\text{total protein}]}{[Ca^{++}] + K/(\text{protein}) \times 10^3}$$

$[Ca^{++}]$ = concentration of ionised calcium
[Total calcium] = concentration of total calcium
[,, citrate] = concentration of ,, citrate
[,, protein] = concentration of ,, protein
all in millimols per litre

K/(citrate) is the dissociation constant of the reversible reaction:

$Ca\ citrate^- \rightleftharpoons Ca^{++} + Citrate^=$ It equals 0·0006.

K/(protein) is the dissociation constant for Ca protein $\rightleftharpoons Ca^{++}$ + protein$^=$ It equals 0·006. The fact that one constant is ten times the other is fortuitous.

Protein is calculated from an average figure of 7% for pooled serum and 4·65% for pooled citrated plasma. The figure is converted into milli-equivalents per litre by means of the factor 2·43 (Van Slyke et al. 1928) and the number of milli-equivalents divided by two, according to McLean and Hastings (1935) gives the value in millimols. The conversion is based on their hypothesis that protein behaves towards calcium as though it were composed of a number of negatively charged divalent ions. This hypothesis they support by experimental evidence.

Ca^{++} has been calculated from the above equation, simplified by the substitution of millimolar contents for

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millimolar concentrations; this does not introduce appreciable inaccuracy. The effect of plasma and serum magnesium on calcium has not been considered: according to McLean and Hastings (1935) the action of magnesium is negatived by the presence of the natural citrate found in small amounts in normal plasma and serum.

It will be seen (table II, column 8) that the figure for ionised calcium is almost the same in all the plasma-serum mixtures, whether the proportion of serum be high or low. It is difficult to escape the conclusion that when serum is used to clot plasma the action is not due to preformed

TABLE II—CLOTTING AND IONISED CALCIUM

Serum (parts)	Plasma (parts)	Ca added	Total Ca	Total Ca	Citrate	Protein	Ionised calcium
		mg. per 100 c.cm.		mM.p.l.			
5	1	0	9·4	2·35	5·1	8	0·29
4	1	1·5	10·8	2·7	6	7·9	0·3
2	1	6	14·9	3·73	10·1	7·6	0·27
1	1	13·5	21·9	5·48	15·1	7·1	0·29
1	1·5	18	26	6·5	18·2	6·8	0·29
1	2	21	28·8	7·2	20·2	6·6	0·29
0	1	42	48·7	12·2	30·3	5·6	0·36

mM.p.l. = millimols per litre.

serum thrombin but to the natural content of serum calcium which becomes available for the plasma in the serum-plasma mixture, and which with any calcium otherwise added helps to overcome the anti-coagulating effect of the citrate. If the clotting effect of preformed serum thrombin were important, it would not be necessary, in serum-rich mixtures, for so much thrombin to be supplied by the plasma; less plasma prothrombin would need to be converted into thrombin and less calcium would have to be added to ensure complete clotting. This would result in a fall of Ca^{++}. The absence of such a fall indicates, as we have seen, that the clotting effect of preformed serum thrombin is unimportant. This is to be expected on general grounds, for while enough thrombin can be formed in one volume of uncitrated plasma to convert the whole into serum, once the conversion is complete so little active thrombin is left, that it now requires five volumes of serum to clot one of plasma.

In spite of this conclusion, however, one must not overlook the fact that serum has some effect in clotting plasma other than that due to its calcium content, for in the last record of table II, where plasma is clotted by calcium alone in the complete absence of serum, sufficient calcium must be added to produce a sharp rise in the ionised calcium. If a certain minimum of serum is present much less calcium is needed to produce complete clotting and Ca^{++} falls; but further increase in serum is not accompanied by a corresponding decrease in ionised calcium. Apart from this obscure qualitative effect, the chief use of serum is to add calcium to citrated plasma and aid clotting without raising the calcium content of the mixture above the physiological level and without decreasing the protein content.

Weaker Citrate Solutions as Anticoagulants

Harington and Miles (1939) used 180 c.cm. of a solution containing 0·85% sodium chloride and 1·05% sodium citrate to prevent the clotting of 360 c.cm. blood or 0·53 g. citrate per 100 c.cm. blood. The M.R.C. recipe at present in use employs 100 c.cm. 3% citrate for 420 c.cm. blood or 0·72 g. citrate per 100 c.cm. blood. Both preparations are efficient in preventing blood clotting, but, while the higher citrate may have a special value in stabilising plasma after filtration through bacterial filter pads, it has a definite disadvantage if the material is to be converted into serum with either calcium or serum or a calcium-serum mixture. If the straight filtration of plasma were ever abandoned in favour of a conversion to serum before filtration, then the following citrate preparation would be suitable: 100 c.cm. of a solution containing 2·22 g. sodium citrate, and 0·2 g. sodium chloride to 420 c.cm. blood or 0·53 g. sodium citrate to 100 c.cm. blood. The use of such a solution would allow of considerable reductions in the amounts of calcium required to produce complete clotting, as a comparison of tables III and I will show.

TABLE III—CALCIUM AND SERUM REQUIRED TO CLOT PLASMA

(Plasma from 420 c.cm. blood with 100 c.cm. 2·22% Na citrate and 20 c.cm. 15% glucose solution)

Serum (parts)	Plasma (parts)	Ca added	Final overall Ca
		mg. per 100 c.cm.	
2	1	5	13·9
1	1	11	19·4
1	1·5	13	21
1	2	17	24·8
0	1	35	41·7

In order to allow a margin of safety the figures in table III are slightly higher than the experimental values, which are shown in table IV and from which the values for ionised calcium are calculated. Citrate in this series was estimated directly. Duplicates did not agree very well (22·4 and 24·2 mM.), but the error will have no effect on the relative values for Ca^{++}, while the absolute effect will be not more than $\pm$ 6%.

TABLE IV—CLOTTING AND IONISED CALCIUM

Serum (parts)	Plasma (parts)	Ca added	Total Ca	Total Ca	Citrate	Protein	Ionised Ca
		mg. per 100 c.cm.		mM.p.l.			
2	1	3	11·9	2·98	7·8	7·6	0·26
1	1	9	17·4	4·35	11·7	7·1	0·28
1	1·5	11	19	4·75	14	6·8	0·27
1	2	14	21·8	5·45	15·5	6·6	0·28
0	1	30	36·7	9·17	23·3	5·6	0·32

It will be seen that the figures for ionised calcium required to produce complete clotting of plasma in this series are, as in table II, about 0·28 mM.p.l. in all systems except the last in which serum is completely absent, and where Ca^{++} is definitely raised.

Clotting by Dialysis

The clotting of plasma by dialysis is at present quite experimental. If citrated plasma is dialysed in Cellophane bags against a solution of sodium chloride (0·8%) and calcium chloride, it is possible to lower the citrate content of the plasma, while the calcium content may be varied at will, according to the amount of calcium chloride added to the saline solution. Thus 1 volume of plasma containing 780 mg. sodium citrate per 100 c.cm. will clot when dialysed against 2·75 volumes of saline containing 15 mg. calcium, while if a plasma with weaker citrate (600 mg. per 100 c.cm.) is used only 2 volumes of saline will be needed. The final plasma calcium is about 13 mg. per 100 c.cm. Dialysis is carried out in the cold room. After two days, the cellophane bags are hung up at room temperature for a few hours to clot, and then returned to the cold room for clotting to complete itself. Dialysis is not continued during the second period in the cold room.

Clotting by means of dialysis involves a reduction of sugar, potassium, magnesium and other substances in the plasma. As the first two are greatly increased in time-expired plasma, a reduction is advantageous. Loss of magnesium and bicarbonate could be made good by adding magnesium salts and bicarbonate (or possibly sodium lactate) to the saline, though it is doubtful whether these particular compensatory modifications are necessary. On the other hand, dialysis may well cause a decrease in other crystalloids, whose importance is not at present appreciated. Finally, it must be emphasised once again that clotting plasma by dialysis is still experimental. It is not certain that consistent asepsis can be maintained during the processing, nor is it known if decrease in crystalloids during dialysis impairs the therapeutic value of the preparation.

Summary

Citrated plasma may be clotted by serum alone or by calcium salts. If serum and calcium are combined clotting may be obtained with an economy of serum and with only a moderate increase in total calcium.

Citrated plasma may also be clotted by dialysis against 2·75 volumes of saline containing 15 mg. per 100 c.cm. calcium. This method does not require serum and the

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final total calcium is only slightly greater than normal. But it does involve the decrease of crystalloids which may conceivably be of physiological importance. Moreover, the processing of material in an aseptic manner may be difficult. At present, clotting of plasma with mixtures of serum and calcium is the method of choice.

In the absence of serum, about 0·34 millimol ionised calcium per litre is needed to clot plasma. If a small amount of serum is added, only 0·28 millimol ionised calcium per litre is needed, but further increase in serum does not cause a corresponding fall in the ionised calcium needed for complete clotting.

REFERENCES

Bushby, S. R. M., Buttle, G. A. H. and Whitby, L. E. H. (1940) *Lancet*, **2**, 131.
Clegg, J. W. and Dible, J. H. (1940) *Ibid*, p. 294.
Harington, C. R. and Miles, A. A. (1939) *Ibid*, **1**, 1348.
Hastings, A. B., McLean, F. C., Eichelberger, L., Hall, J. L. and Da Costa, E. (1934) *J. biol. Chem.* **107**, 351.
McLean, E. S. and Hastings (1935) *Ibid*, **108**, 285.
Med. Res. Coun., Lond. (1940) War Memorandum No. 1.
Picken, L. E. R. (1941) *Lancet*, **2**, 190.
Pucher, G. W., Sherman, C. C. and Vickery, H. B. (1936) *J. biol. Chem.* **113**, 235.
Stanbury, W. S. (1941) personal communication.
Van Slyke, D. D., Hastings, A. B., Hiller, A. and Sendroy, J. jun. (1928) *J. biol. Chem.* **79**, 769.

FLEXED PLASTER SPICA
FOR FRACTURED FEMORAL NECK

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THE treatment of fractures of the neck of the femur depends on the age and general condition of the patient, the site and angle of the fracture, and on the presence or absence of impaction, displacement or comminution. It is dangerous to confine an old person with a fractured hip to bed, because of the risk of bedsores, pneumonia, and mental and physical deterioration. In the days before good reduction and fixation, when fracture of the neck of the femur was regarded as the "unsolved fracture," the case-mortality was 16% (Nix 1916) to 18% (Speed 1916). About forty years ago, Royal Whitman of New York pointed out that fractures of the neck of the femur could be reduced by manipulation and fixed in abduction, extension and medial rotation of the hip, with the expectation that bony union would take place in 50% of the intracapsular fractures. This was a great step forward, but even so the mortality of this method has been 12–15% (*Lancet*, Sept. 13, 1941, p. 316). Löfberg (1924) reports the end-results of the abduction method in 306 cases of fracture of the neck of the femur; 67% of the medial fractures united by bone, and all the basal fractures. In the abduction fracture at the subcapital level the fragments are impacted at the outer side. Conservative measures may be employed with confidence in obtaining bony union in such cases. Adduction fractures may occur at any level. The effect of muscle-pull and weight-bearing on this class of case is to drive the fragments past one another, especially if the fracture-shaft angle is small. Careful and complete immobilisation of the reduced fracture is essential. The position of the fracture line, its inclination, and the presence or absence of comminution are important in prognosis, whatever method of treatment is employed. Not only transverse fractures of the neck of the femur are encountered but also spiral, oblique and comminuted fractures. Leadbetter (1933) points out that it is as difficult to maintain position in a spiral and comminuted fracture of the neck of the femur as in any other bone. Shatara (1941) finds that subcapital and comminuted fractures have been disappointing in their response to internal fixation. The nearer the fracture to the head of the bone, the poorer is the blood-supply and the more difficult to maintain reduction.

What is known as the fracture-shaft angle may be taken as an accurate index of the thrust and shearing forces to which the fracture is subjected. One line of the angle is the axis line of the femoral shaft, and the other follows the fracture-surface on the shaft fragment, as seen in the anteroposterior film of the hip when medial rotational displacement has been corrected. In connexion with Pauwel's angle also it has to be borne in mind that there may be considerable shearing force concentrated in the angle shown in the lateral view. The fracture-shaft angle must be given due value in assessing indications for correct treatment, if operation is contemplated. In a critical review of the final results of the operative treatment in 75 intracapsular fractures treated by closed pinning, Eyre-Brook and Pridie (1941) consider that if there is a low fracture-shaft angle, below 30°, the case requires more than Smith-Petersen's triflanged pin alone; either the addition of a bone-graft is required or the case should be treated by subtrochanteric sliding osteotomy. While internal fixation can be applied to most intracapsular fractures, it is not to be recommended in some.

Internal fixation (Smith-Petersen et al. 1931, King 1935, Putti 1940) is the method which has first claim in most adduction fractures of the narrow part of the neck of the femur, and it is often chosen for uncomminuted, displaced fractures of the broad part. But in spite of the good results obtainable in expert hands by this method, studies of end-results now beginning to appear make it clear that intracapsular fractures of the neck of the femur still present a difficult problem. A commission set up by the American Academy of Orthopædic Surgeons (1941) has analysed the late results of internal fixation in 247 subcapital and transcervical fractures. Bony union followed in 169 cases (70·1%), non-union in 30%. The analysis of 923 cases treated by operation revealed a mortality of 11·6%—a figure very similar to that obtained with the Whitman method. Arthritic changes developed in a quarter of the cases in which bony union was obtained. In the series of Eyre-Brook and Pridie (1941), bony union occurred in 70% of the intracapsular cases.

From a considerable personal experience of nailing intracapsular fractures I find that the majority unite by bone, but I have been disappointed by the commonness of late arthritis. Cases of aseptic necrosis have not occurred, probably because the subjects were not young. All cases of fracture of the neck of the femur do not live on uninterruptedly well after successful pinning. Bony union from conservative treatment is the best obtainable, because there are no unfortunate immediate and late complications to be feared. In view of the varying circumstances and conditions in which fractures of the hip are treated, conservative methods can be advised with a good deal of confidence on account of the excellent end-results achieved in a high proportion of cases. Cases occur in remote parts of the country and in the Outer Islands where expert care by operation is not always readily available. If an intracapsular fracture of the neck of the femur is well reduced and held, it has a good chance of uniting by bone. If bony union does not take place, it is possible to appreciate the fact in time and resort to nailing. Actually, half the intracapsular fractures of the femoral neck unite by bone with conservative measures. With new facts coming to light, it should be possible to recognise the type of case favourable for obtaining bony union by a conservative method, and the type which will give poor results by operation.

It may be objected that, while good closed reduction to a hair-line may well be obtained by the appropriate manœuvre, adequate fixation cannot be obtained in a plaster or appliance for intracapsular fractures. The reply to this is that in the event of really good reduction —possibly completed by Cotton's (1924) impaction— of an intracapsular fracture, any movement which may take place subsequently at the hip is more likely to occur at the joint than at the fracture.

HIP-FLEXION METHOD

Plaster fixation of the reduced fracture in flexion of the hip should help in solving the problem of treatment. It offers special advantages in some cases, and even may be the method of choice for a particular case. It provides a middle course between internal fixation and the prolonged confinement to bed necessitated by the Whitman extended and abduction position, the Wilkie butterfly splint or the Roger Anderson well-leg traction method for basal or pertrochanteric fractures. In impacted fractures of the broad part of the neck of the femur, it may not be advisable to undo the impaction.

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Immobilisation in a light, close-fitting plaster spica, applied with the hip in flexion and moderate abduction, makes it possible for the patient to be lifted out of bed daily, to change her position in bed, and to lie for a little each day in the prone position. These are outstanding advantages. If the nurses are asked how they like the method, they reply that it is most satisfactory. They find it easy to handle the patient and to look after the sacrum. The patient and household, too, express satisfaction. It saves the financial drain of a long period in nursing-homes and hospitals, for the patients can be sent home in a few days, and it is a method within the compass of the general practitioner who lacks hospital or surgical facilities. It is peculiarly applicable to sparely built subjects, to cases of early or reduced adolescent epiphyseal coxa vara, to fractures of the narrow part of the neck of the femur (both varieties), and to basal and trochanteric fractures after reduction of the displaced cases. It can also be applied to subtrochanteric fracture if the fracture is oblique from the outer side inwards and downwards.

The method is referred to in the textbooks but has not been in common use because light close-fitting plasters were not employed when the method was first described. Then plasters were thick heavy and cumbersome, applied over thick padding, so that it became no easy matter to lift the patient out of bed, especially if she was stout and heavy. But plaster technique has improved much in recent years. Fixation in plaster of the reduced or impacted fracture of the femoral neck is the only conservative method, except the Bradford (1922) abduction splint, which allows the patient to leave her bed daily and lead a life of comfort and partial independence during the healing stage.

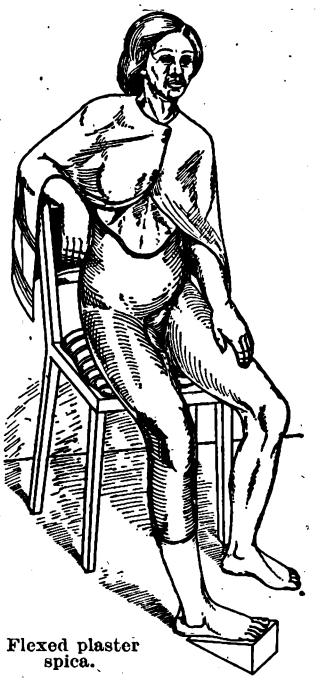
CASE-HISTORY

A woman of 84 had a fracture of the middle of the neck of the femur with considerable displacement. An hour before reduction Omnopon, gr. ⅓, was given hypodermically. A small dose of procaine hydrochloride (Neocaine) 80 mg., was given intrathecally. Stockinet (a thin combination suit of underclothing will do) was drawn on to the limb and trunk. The bony prominences of anterior and posterior iliac spines, the head of the fibula and the sacrum and lumbar spines were covered by strips of sticky white felt applied to the stockinet. The patient was lifted on to a pelvic rest, the head and shoulders being supported on a padded box. If a pelvic rest is not available, a small upturned basin is used to support the pelvis. The sound limb was held by an assistant. The reduction of the fracture was performed by the Leadbetter manœuvre.

To apply this method, the assistant supports the unaffected limb in moderate abduction and steadies the pelvis. The surgeon faces the injured hip and flexes the knee and hip to a right angle. He grasps the ankle with one hand and supports the flexure of the knee on his other forearm. By standing on a platform of sufficient height to permit of his holding the limb thus, with his body in a half-stooping position, the surgeon overcomes the shortening and practically all the displacement by straightening himself up. No additional force is required; a steady lift suffices, keeping the limb in a little lateral rotation while doing so. The surgeon now steps off the platform, bringing the hip and knee slowly and steadily into the extended position, at the same time carrying the hip into about 15° medial rotation and then into the abducted position. An assistant measures the lengths of the limbs, to see that shortening has been corrected. Leadbetter's clinical test for reduction is applied. This consists in noting that when the heel of the otherwise unsupported limb is lying upon the palm of the surgeon's open hand, the limb no longer rolls out into lateral rotation.

In this case one felt confident that complete reduction had been obtained and equally confident that, by now gently flexing the hip by about 50° to 60° and reducing the degree of abduction to about 20° from the midline, movement would be more likely to take place at the hip-joint than at the site of fracture. So it proved. The knee was kept flexed by about 25° from the extended position, so that the lower leg acted as a crank-handle to maintain position. X-ray films of the hip were taken in two planes, first in the extended and then in the flexed position. It was found that a hair-line reduction had been obtained.

A close-fitting, light and carefully moulded short plaster spica was applied (see figure). Such a plaster need be only about ⅛ in. thick, save for reinforcement by slabs ⅛ in. thick applied to the anterior, posterior and lateral aspects of the hip. The foot and ankle have a separate, removable posterior plaster splint made for use in bed. It is carried about 1 in. beyond the toes, to keep the weight of the bedclothes off the foot. In moulding the plaster spica of the hip, the knee and lower third of the thigh are compressed laterally by the palms of the hands. Firm anteroposterior compression is used at the mid and upper thigh. It is also moulded firmly between the trochanter major and the iliac crest and above the iliac crests. In applying the plaster it is important to cover the buttock adequately; this is often done incompletely.



Flexed plaster spica.

The patient was lifted out of bed two days later, to sit up comfortably in a chair all day. This routine was carried out daily. Soon after the application of the spica, part of the casing was cut out anteriorly over the lower leg and knee to permit of motion in the knee for a short period every day; quadriceps drill was started, and a domette bandage used to hold the knee back again in 25° flexion. She was sent home a week after she had first got up. The district nurse attended her every morning, and, with the assistance of the patient's daughter, helped her into a chair for the day. The patient was soon able to give a good deal of assistance. She went on uninterruptedly well, bony union in perfect position took place, and the leg is as good as ever. There is full movement in the foot, knee and hip, and the patient is active and well.

DISCUSSION

It is worth digressing to note that fractures through the broad part of the neck of the femur and the trochanter major are not unattended by a real risk of fatal pulmonary embolism. This risk seems to be lessened if reduction is performed within the first 48 hours after injury; 7–10 days after the fracture is the dangerous period. I have notes of 5 cases, occurring during a period of 2 years, of proved fatal pulmonary embolism arising at the time of attempted reduction of basal and trochanteric fractures in old female subjects. The embolism took place in each case at the time of attempted reduction, 7–10 days after the accident. If it is decided to reduce a fracture in this region, it should be done forthwith or after a delay of three or four weeks. The danger is a real one, and relatives should be warned of it.

It is commonly imagined that the abduction method of treating fractures of the neck of the femur consists only in carrying the limb out into abduction. Reduction cannot take place until the shortening has been manually corrected, the trochanter and shaft have been lifted forwards, and lateral rotation has been corrected; it is then that abduction is carried out. The Leadbetter manœuvre and test should be known to all who may have to deal with these injuries.

Persistent local tenderness is a diagnostic sign in these cases of fracture of the femoral neck, which often occur in stout subjects in whom the classical features of shortening, deformity and complete loss of function are absent. The pain is often referred to the thigh and knee and not to the hip itself.

Moore (1928) has employed the plaster fixation method routinely and successfully for many years. He states that owing to the position of flexion, abduction and medial rotation, the capsule and muscles of the hip are used advantageously in maintaining reduction, and that flexion puts the gluteus maximus and medius on the stretch, thus forming a strong natural hammock and preventing backward displacement and eversion of the

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thigh. He urges the use of spinal anæsthesia in reduction. Campbell (1919) reported the successful use of the method in 3 cases. Judet (1921) also reported favourably on it. Cannaday (1930) reports that for several years he has advocated and practised the application of a plaster case in a modified Whitman position. He calls it the sitting Whitman position.

My own experience of the flexion method, though not extensive, has been satisfactory, and I have been favourably impressed by the comfort and well-being of the patients. The method can control the reduced fracture effectively, but if there is doubt about this, the other thigh can be included and a cross-bar for lifting incorporated just above the knees. It is possible to attempt reduction under morphia alone, but the addition of a local or spinal anæsthetic is preferable.

Plaster fixation is the revival of an old method, but with a difference. It is applied after accurate reduction, controlled by improved X-ray technique, and relies on the efficiency and lightness of a close-fitting plaster.

SUMMARY

Fractures of the neck of the femur are important and common injuries, associated even now with considerable mortality and disablement.

Reduction and immobilisation, combined with as much normal activity of the body and limb as possible, are the immediate objectives of treatment.

The hip-flexion method with plaster fixation has a part to play in achieving these aims, and in promoting union.

REFERENCES

American Academy of Orthopedic Surgeons (1941) *J. Bone Jt Surg.* **23**, 386.
Bradford, E. H. (1922) *Surg. Gynec. Obstet.* **34**, 266.
Campbell, W. C. (1919) *Ann. Surg.* **70**, 600.
Cannaday, J. E. (1930) *Ibid*, **91**, 750.
Cotton, F. J. (1924) Dislocations and Fractures, Philadelphia, p. 528.
Eyre-Brook, A. L. and Pridie, K. H. (1941) *Brit. J. Surg.* **29**, 113.
Judet, H. (1921) *Bull. Acad. Méd. Paris*, **85**, 63.
King, T. (1935) *Med. J. Aust.* **2**, 521.
Leadbetter, G. W. A. (1933) *J. Bone Jt Surg.* **15**, 930.
Löfberg, O. (1924) *Acta chir. scand.* **57**, 504.
Moore, G. A. (1928) *Ann. Surg.* **87**, 111.
Nix, J. T. (1916) *New Orleans med. surg. J.* **68**, 768.
Putti, V. (1940) Cura Operatione delle Fratture del celle del Femore, Bologna.
Shatara, F. I. (1941) *Amer. J. Surg.* **53**, 32.
Smith-Petersen, M. N., Cave, E. F. and Vangorder, G. W. (1931) *Arch. Surg., Chicago*, **23**, 715.
Speed, K. (1916). Quoted in Wilson and Cochrane's Fractures and Dislocations, 2nd ed., p. 491.

ACUTE BACTERIAL ENDOCARDITIS

TWO UNUSUAL CASES

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Two atypical cases of acute bacterial endocarditis, each possessing distinctive features, have recently come to our notice.

CASE 1.—A married woman aged 60. Her past history was given by her husband, an intelligent observer. She was quite well until Jan. 4, 1941, when she was taken ill in the night and vomited, complaining of severe pain in the left chest and back. She remained in bed, and on Jan. 6 complained of sudden severe pain in the left foot, which went white, and then became blue as the pain decreased. On the evening of Jan. 11 the same phenomenon occurred in the right hand. On Jan. 6 small purpuric spots had appeared in the skin over both patellæ, and on the same day her nose and the surrounding 1½ in. of the face had become faintly blue. She complained of no pain in the nose until Jan. 11 when it had become deeply discoloured (fig. 1).

When admitted to hospital on Jan. 12 her pulse-rate was 124; temperature 96·4° F., respirations 30. The pulse was regular in the left arm, but in the right arm no pulsation was palpable in the radial artery or ante-cubital fossa. In the left foot, which was cold and blue, pulsation in the dorsalis pedis artery was present and equal to that in the right foot. The nose was a deep purple and tender, and the skin around it was discoloured by petechiæ. The heart was enlarged towards the axilla, with the apex-beat 1 in. outside the midclavicular line. The heart-sounds were distant, but both could be heard in all areas; there was a soft blowing systolic murmur at the apex conducted to the axilla. Blood-pressure 130/80 mm. Hg. The patient was drowsy on admission and gradually became more so. The nose became more deeply purple, and the blueness of the right hand spread slowly up the forearm. A blood-count on Jan. 14 showed red cells 3,000,000 per c.mm.; white cells 42,000 (neutrophils 84·8%, lymphocytes 3·1%, monocytes 4·1%, no eosinophils or basophils, myeloblasts 2·3%, premyelocytes 2·3%, myelocytes 2·7%, metamyelocytes less than 1%); in counting 300 white cells 1 megaloblast, 1 early erythroblast, 2 late erythroblasts and 1 normoblast were seen. Polychromasia, punctate basophilia, anisocytosis and poikilocytosis were noted.

FIG. 1—Nasal discoloration due to infarct.

By Jan. 18 pulsation in the right dorsalis pedis artery was no longer palpable and cyanotic patches had appeared on the left thumb, index and second fingers from deep hæmorrhages. Shortly before her death on Jan. 23 the skin of her alæ nasi was becoming detached. Throughout her illness she was afebrile.

At *autopsy* the findings were those of acute bacterial endocarditis. The right pleural cavity contained 140 c.cm. of blood-stained fluid. The heart weighed 13 oz.; myocardium flabby and pale. Infected clot in tip of right ventricle, attached to the wall of the chordæ tendineæ. Tricuspid and mitral valves normal. Ulcerating vegetations, in one of which masses of cocci were found, were growing on each cusp of the aortic valve. Coronary arteries normal. Numerous red infarcts in both lungs. Sections showed emboli with clumps of cocci in both kidneys and the spleen.

Clinically this seemed to be a case of multiple emboli being thrown off into the blood-stream from the endocardium. The blood-count, notable for the large number of primitive white cells, was against a diagnosis of endocarditis, and so were the following clinical points: she was afebrile throughout; there was little evidence of valvular disease of the heart; the exactly symmetrical cyanosis of the nose was perplexing, in view of the organ's bilateral vascular supply; the occurrence of the pulmonary emboli before the systemic emboli was difficult to explain.

In the light of the autopsy findings the absence of fever remains inexplicable. There should perhaps have been some indication of the aortic involvement on auscultation, but no murmur was heard in spite of repeated examination with this point in mind. The case serves to emphasise the fact that signs in the heart are often lacking in cases of endocarditis. The symmetrical cyanosis of the nose had arisen from a single small embolus obstructing the bifurcation of a branch of the external maxillary artery into the lateral nasal and superior labial arteries on one side. Thrombosis had occurred subsequently along the superior labial artery to the junction at the bifurcation on the opposite side, thus effectively obstructing the arterial circulation to the area affected. The pulmonary infarcts were secondary to systemic emboli blocking branches of the coronary artery, with the resulting infarction of the myocardial tissue they supplied. Vegetations formed on the damaged endocardium at the apex of the right ventricle and portions were carried into both lungs. The clot formed on the endocardial aspect of one infarct supplied a ready nucleus for the incubation of the causal organism, and the dislodgment of this first thrombus left a suitable starting point for further thrombi to form.

CASE 2.—An unmarried woman, aged 21, was sent into hospital as a case of pericardial effusion. She was well until Feb. 2, 1941, but that evening complained of pain in her back, running up both sides of the vertebral column, into the neck, and over the head. She had had vague pains in her abdomen and legs. On Feb. 3 she went to bed where she remained until seen by her doctor, who sent her into hospital on Feb. 7. At 14 she had been in an orthopædic hospital for a Hibb's spinal grafting operation for Pott's disease. She

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had not had rheumatic fever or any other diseases relevant to the present illness.

On admission the pulse-rate was 112; temperature 101·2° F.; respiration 28. She was complaining of pain in the left chest which checked full inspiration. She was very cyanosed about the face and lips; her respirations were laboured, with the alæ nasi working. Tongue coated; pharynx flaked with pus. Pulse regular; apex-beat in third interspace, 1½ in. within the midclavicular line. The whole heart appeared to be rotated by the kyphoscoliosis resulting from the spinal caries, so that the apex was displaced upwards and inwards. The first and second sounds were well heard at all areas, but faded in intensity on inspiration. First sound loud and slapping at all areas. A blowing systolic murmur was heard at the apex and conducted to the axilla. At the aortic and pulmonary areas, a diastolic murmur was heard. There was no pericardial friction, or other exocardial sound. The chest was difficult to examine on account of the spinal graft. There was definite dullness on percussion at both bases, with poor movement and greatly diminished air entry at the right base. These findings, with the raised temperature, pulse, and respiratory rates suggested bronchopneumonia. No other abnormal findings.

She was started on a course of sulphapyridine, but this had no effect on her temperature, which fluctuated between 100° F. and 103° F., and the drug was stopped after 12 g. had been given.

Blood-count on Feb. 8 showed white cells 4300 (neutrophils 74%). Blood-culture in glucose-broth medium on Feb. 7 gave a heavy growth of *Staphylococcus aureus*, within 48 hours of incubation. Blood-count on Feb. 9 showed an increase in white cells to 11,000 (neutrophils 82%). She slowly deteriorated and died in coma on Feb. 10.

At *autopsy* the lungs contained multiple red infarcts, the parenchyma being congested and œdematous. There was a small effusion in both pleural cavities. The heart was of normal size; musculature of the ventricular walls of average consistence, the right ventricular muscle being definitely thicker than the left. The interventricular septum was deficient in the upper third. Aortic and mitral valves normal. The pulmonary valve consisted of only one cusp, with two rudimentary attempts at division. Lying in the pulmonary arterial wall immediately distal to the valve were two depressions in which lodged two large thrombi (fig. 2). This was evidently the source of the pulmonary infarcts. Minute beaded nodules could be seen along the free margin of the single pulmonary cusp, indicative of an early valvular infection. The pulmonary artery itself was much narrowed in the first inch of its course.

The girl had apparently led a perfectly normal life up to the time of this illness, and had not been at all incapacitated by such a grossly deformed heart, beyond getting somewhat blue in the face when climbing stairs.

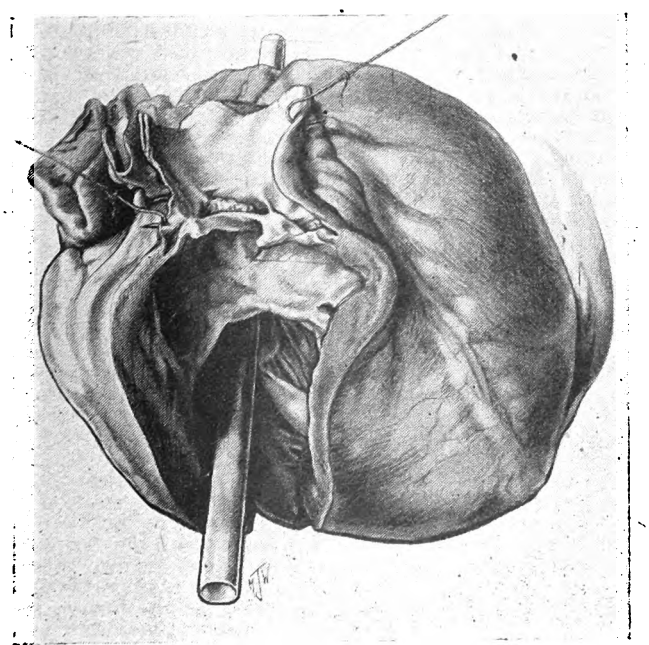

FIG. 2—Heart showing single pulmonary cusp, and depressions behind it containing thrombi.

In her "Atlas of Congenital Diseases of the Heart," Maud Abbott does not mention any reported case of a single pulmonary-valve cusp, but the condition is referred to as a rarity in pathological works. This case also bears out the teaching that it is uncommon to find bacterial endocarditis affecting the right side of the heart except in the presence of congenital cardiac deformity. We wished to keep the heart intact as a museum specimen, so the depressions in which the thrombi had formed were not explored. It is, however, reasonable to suppose that vegetations had developed at the valve bases at the same time as those on the cusps, and that these had led to the formation of the thrombi. The infection was with *Staph. aureus*, which is uncommon in bacterial endocarditis. Section of the diseased valve confirmed the presence of endocarditis and of bacteria.

We are indebted to Miss Margaret Williamson for the illustration of the heart, and to Dr. Raymond Greene for the photograph (originally in colour) illustrating the first case.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the Section of Surgery on Dec. 3, with Mr. E. ROCK CARLING, the president, in the chair, a discussion on

Effects on the Kidney of Trauma to Parts other than the Urinary Tract

was opened by Dr. E. G. L. BYWATERS. Outlining the various types of excretory impairment following trauma, Dr. Bywaters pointed out that the oliguria common after most severe traumata, as well as the albuminuria, hyaline casts and transitory rise in blood-urea concentration sometimes seen, is a functional impairment, due to extrarenal causes, and that renal tubular function itself is seldom impaired. He drew an analogy with the azotæmia of gastrointestinal hæmorrhage, where one or more of four factors—increased urea formation, decreased filtration pressure, decreased renal blood flow, and decreased renal reserve—may in any given case be involved. After referring to the renal damage following burns and traumatic liver necrosis, he gave an account of crushing injury or compression syndrome, based on 60 cases collected by the M.R.C. through observers throughout the country. This syndrome was first described in Germany during the last war, and it occurred unrecognised after the Messina earthquake in 1909; it was not, however, referred to in Anglo-Saxon writings, despite its occurrence in mining accidents, as McLelland has recently recorded from Canada, and after traumatic injuries to main vessels in civil life. Most cases show no fall of blood-pressure, yet many of these have a reduced blood-volume with hæmoconcentration and compensatory vasoconstriction. This type, only recognised on careful observation, was illustrated by a "crush" case observed by Riddell and Dow without "shock," in which myohæmoglobinuria and temporary azotæmia was associated with loss of a litre of plasma into the tissues and little external sign except some tenseness of the skin over one trochanter. The most important biochemical feature of these cases is the tendency of urinary urea and chloride to approximate to that in the blood, pointing to tubular dysfunction. The associated fall in alkali reserve and rise of serum potassium and phosphate possibly may be partly due to absorption from damaged tissue. Biochemical evidence of recovering tubular function has been seen in a fatal case; death is often sudden and associated with cardiac irregularities not unlike those seen in experimental potassium poisoning. Dr. Bywaters then demonstrated the pathological appearances, particularly emphasising the pigmented casts in the collecting tubules and the necrosis seen in the distal convoluted tubules and in Henle's loop at the boundary zone, with discharge of hyaline casts into the interstitial tissue. This renal change is not specific, for it has been seen after septic abortion, in severe cachexia, in idiopathic paralytic myohæmoglobinuria, and in mismatched transfusion. The pigment excreted in "crush" cases, however, is not hæmoglobin but myohæmoglobin, whose renal clearance

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is 25 times as great, accounting for the lack of plasma pigment. The myohæmoglobin comes, with other autolytic products, from muscle. Microscopically there are three types of muscle necrosis—first, that due to direct pressure ischæmia where the line bounding the necrotic zone corresponds with that in the skin; secondly that probably due to rise of intrafascial tension, where the whole muscle is necrotic irrespective of skin areas; and thirdly, where there is necrosis of isolated fibres only. The last may be due either to vasospasm, illustrated by a case with perivascular hæmatoma, lack of limb swelling and little if any hæmoconcentration, or to traumatic arterial rupture with limb ischæmia, illustrated by a case seen with Mr. W. H. Graham, following a traffic accident without prolonged compression. In a given case any or all of these varieties may be present. Apart from the importance of muscle ischæmia, pathogenesis still remained as obscure as that of the anuria of mismatched transfusion, but experiments on dogs by Professor Winton and on rabbits at the London Postgraduate Medical School indicate that there are two factors necessary, one producing tubular damage and the other, possibly, obstruction. Prognosis is difficult, depending on the extent of injury, the rise of blood-urea, and the establishment of a diuresis. A third of the cases have recovered. Improvement here, Dr. Bywaters suggested, will depend on thinking of renal failure immediately after, or even before, admission, instead of about the fourth day, and protection with alkalis and adequate diuretics before treatment of the shock and the local ischæmia. He concluded by emphasising the present ignorance, particularly of the early stages, and pleaded for earlier and more detailed observations.

Mr. R. H. R. BELSEY discussed the surgical treatment of the local lesion in relation to the more general changes, and urged the extreme need for detailed observations recorded at the onset of injury and treatment; fully investigated cases are still too few for treatment to be other than speculative. He cited the changes observed in the crushed limb—œdema with muscle pallor, and necrosis, sometimes corresponding to the areas of direct pressure; an increase of tension within the fascial compartments of the limb; peripheral arterial pulsation, sometimes absent when the case is first seen, or an initially weak pulse becoming progressively obliterated. Sometimes, however, the pulse is normal, and in one case was stronger than in the uninjured limb. At autopsy there is rarely evidence of thrombosis or gross damage to the main arteries of the limb, although in a few instances rupture of a major vessel has been found. Intense arterial spasm, demonstrated at operation, seems to be a common cause of the ischæmia. Loss of nerve function has been recorded in the majority of cases, probably due to ischæmia rather than to direct pressure, but this usually lasts only 6–12 weeks. The skin shows erythema and later blebs, but as a rule evidence of gross trauma is slight. From these observations he deduced that the muscle necrosis is ischæmic in origin, due probably to traumatic arterial spasm and possibly to direct pressure also; that with restoration of the blood-supply to the limb there occurs a flooding of the circulation with a hypothetical toxin, and passage of plasma from the blood into the damaged tissues of the limb, resulting perhaps in an increase in subfascial tension. Mr. Belsey then put four queries, answers to which are necessary to plan rational treatment. How long a period of ischæmia is needed to produce necrosis? He has recently seen a case trapped for 45 min. only, although reflex vascular spasm may have been present for longer. Is "toxin" production continued after restoration of limb circulation? At what stage does renal damage take place? Is muscle necrosis the sole cause of the renal damage? Searching for collateral evidence, he has found no mention of renal damage in cases of Volkmann's contracture or in the case-records of all patients with limb fracture admitted to a general hospital during the last ten years (although this will not surprise anyone who has ever attempted to elicit vital information from hospital case-notes). Allen's experimental work on refrigeration in ligated limbs may throw some further light on treatment. It is difficult to assess the effect of surgical treatment, especially when many forms of therapy have to be used concurrently. He asked for detailed and accurate observation of all cases and deprecated the tendency to record only cases that recover and to suppress the failures. Operative treatment has been little employed as yet, probably, he thought, quite rightly. Primary amputation has been performed in three cases, two of which were fatal and one recovered. Decompression of the limb by incision of the deep fascia has been done in seven cases, of which only three have been recorded; three died and four survived. Decapsulation of the kidneys has been performed in one case with established renal failure, but the patient died. Two distinct problems emerge—to save the patient's life, and to save his limb. The two aims may be mutually antagonistic, in that restoration of the circulation to the crushed limb may lead to a sudden flooding of the body with toxin. Mr. Belsey then briefly described five cases admitted to St. Thomas's Hospital Sector. One case with both legs crushed was given "rest and quiet" only until the fifth day, when muscle decompression was performed; she died next day. Another, with a crushed arm, was also decompressed, and recovered satisfactorily. A fourth case will delight the non-interventionists, for despite extensive damage and a blood-urea of 460 mg. per 100 c.cm. the patient recovered. The most recent case was crushed for 45 min. only and showed multiple fractures, myohæmoglobinuria and typical post-mortem findings. No evidence has yet been published that surgical treatment has played any part in saving life, and the picture is still too confused for any conclusions on treatment. He pleaded for more objective observation and less speculation on treatment.

Dr. JOHN MCMICHAEL reviewed the present ideas on treatment. Since there is strong clinical and experimental evidence of the importance of autolytic products from muscle in the genesis of renal failure, a rational approach would be to ensure a good flow of urine by warm drinks before release. Since these hypothetical noxious substances are only absorbed after re-establishment of the circulation to the leg, a tourniquet may be valuable until such a protective diuresis has been established. Further slowing of autolysis can be achieved by surrounding the limb with ice, which by slowing metabolism will also avert incipient gangrene. Sodium citrate and bicarbonate given in adequate dosage will combat the invariable acidosis and may thereby minimise renal damage. It may also prevent pigment precipitation. Other diuretics have been tried, but there is little evidence to favour one more than another.

Mr. DAVID PATEY remarked that, as far as surgical experience in this country is concerned, this is an entirely new problem. He objected to the current use of the phrase "crushing injury" because, in the cases he has seen, there has been no crush in the surgical sense; he prefers the term "compression syndrome." The policy of healthy neglect he thought dangerous, and cited a case to support this belief; only by continued observation in the early stage can serious cases be distinguished from trivial ones. He then propounded the theory on which was based the treatment used in the two cases published in THE LANCET (1941, 1, 780)—that renal damage may be due, not to the passage of substances from muscle to blood but the reverse; since those initial attempts to restore fluid from the limb back into the general circulation he has had no further cases.

Mr. V. H. RIDDELL said that early protection of the crush case implies early recognition. This can only be achieved by a thorough examination of every case, for in some there is no symptom and only the slightest external sign, such as a transient erythema, to mark a deeper lesion which will later produce renal damage. He directed attention to the oliguria seen after other types of shock, including that of surgical trauma, the occasional presence of albuminuria, red cells and casts in the urine of air-raid casualties which has recently been recorded by Grant and his co-workers. Mr. Riddell is now making a routine study of all urine passed after severe operative trauma.

Prof. J. SHAW DUNN spoke on the pathology of the condition, emphasising the localisation of the necrosis to that part of the nephron used for concentration and acidification. He pointed out the similarity to the tubular necrosis evidenced in animals by phosphate and uric acid, and agreed with the treatment proposed by the previous speakers.

Mr. R. H. O. B. ROBINSON asked for information on the value of oxygen therapy and sodium sulphate.

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Major DANIEL MAGNER, Mr. J. C. F. LLOYD WILLIAMSON (in conjunction with Dr. J. M. JANES) and Mr. W. H. GRAHAM in turn described cases they had had under their care, in each of which, after a traffic accident with traumatic rupture of the main leg arteries, the patient had survived the immediate shock, and that due to subsequent surgical treatment by means of massive transfusions, only to die several days later in uræmia. In the kidney, changes very similar to those of crushing injury were found, although in none of the four cases had compression lasted longer than a few minutes. It was mentioned in the discussion on these cases that the pigment of the urine had not yet been identified.

Mr. RUSCOE CLARKE presented a case of minor renal disturbance discovered by careful biochemical study in a patient with a major limb injury from an automobile accident. An initial period of oliguria preceded amputation in spite of normal blood-pressure. After amputation the urinary output and urea concentration rose in spite of a fall in blood-pressure. Further specimens of concentrated urine contained numerous hyaline casts. Recovery was uneventful without further sign of renal involvement. The disturbance was presumably prerenal, associated with incipient shock. The case illustrates the type of minor renal dysfunction following trauma which may easily be overlooked.

Mr. GUY BLACKBURN bore witness to the value of sodium sulphate and alkali, urging the importance of correcting the acidosis seen in these patients; he castigated those who have called this the "continuous interference syndrome" and thought that the policy of healthy neglect is mischievous. Anuria may be due to sulphapyridine, but is in some cases not a failure to secrete but an inability to pass urine; he advocated, instead of the daily catheterisations sometimes necessary, the institution of tidal drainage.

In England Now

A Running Commentary by Peripatetic Correspondents

Two of the first babies I delivered after I had settled in this practice left school this summer. Mary is going to my old hospital to nurse, Joan has started at the university. I am fond of them both, but Mary's decision brought back vividly my time in the private wards when for four weeks I lay on my back and a number of probationers, staff nurses and two sisters came at odd times to minister to me physically or stimulate my inquiries. So competently did they dispel my aches and pains by the way they dressed my wounds or rolled me about that I decided there and then that I would value my own surgical skill less and attribute a good deal more to the nurses. I even wished that every surgeon who is rude and cantankerous to his staff should fall into the power of those he fumed at, so that he might appreciate their skill.

But my time as a patient left me with other queries. What is it that makes some nurses good and others bad? Is finance alone (as some seem to think) the key to attracting better probationers? From my experience I am clear that the nursing school counts. This is not mere pride in my alma mater. Those who controlled me so quietly were not merely efficient automata, they were also intrigued with their duties. Sisters, tutors and ward sisters had given them an interest in their patients not merely born of necessity. In other words, they were motherly and all-expectant, but they brought what must be called intellectual stimulus to their job as well. The sentimentally sympathetic one bored me; the best educated one alarmed me. The former seemed to be treating me rather as I suspect she treated her dolls till the age of 12. The latter had ideals and ideas, but she didn't carry out the heroic and her plans for the future she had to admit were absurd. It all sounds very well on paper, and she might convince audiences but not colleagues. The first hadn't grown up; the second was in nursing from mistaken motives. The one had little use for intellect, the other had hardly any conception of "understanding."

As one reads the reports of those who want to attract more women into the nursing profession, one wonders whether salaries loom as large as they are said to and how far the tales that "nursing is a glorious profession" stir the adolescent. As far as discreet inquiries could go, none of my mentors had private means but the glamour motive of Florence Nightingale had loomed fairly large. Are the words "glorious profession" really representative? Just as the university graduate speaks glowingly of his three years as a student, so the nurse waxes enthusiastic over the life in hospital. Does finance count much? Big salaries may attract potential nurses into other posts. I doubt if poor pay discourages many enthusiastic schoolgirls. Their idealised nurse may be a creature "that never was on sea or land," and the new probationer's first contact with an unimaginative ward sister may set the tone for all her future musings on her profession. I am concerned not so much for finance, nor for the junior, but for the equipment of the trained nurse who as a sister in her own or another hospital will influence so greatly the probationers she trains.

What is it that we ask from our nursing students? Physical labour, rigid compliance with a certain tradition, keen observation, a willingness to suffer criticism, thanklessness. We offer the satisfaction of well-earned fatigue, gratitude from patients and a keen development of the five senses that converts the senior sister into an acute observer (more acute than any man doctor usually is), with friendship and a deep-seated realisation of the maternal instinct. When Mary's friend Joan goes to the university, what is she offered over and above learning? Some insight into scientific methods and a closer understanding of great minds, the ability to connect more and more of the jigsaw of experience and to see where economics influences politics, geology directs trade, human incompatabilities affect national aspirations. Most important of all, she discusses with her colleagues, not the crushes of schoolgirls, but the interconnexion of all she studies with the world she learns of in the debating hall or from the social and cultural difference of students drawn from divergent schools.

It is easy to assume that Joan's experience at the university is better in quality than Mary's in hospital. We hear a good deal of "nurses only interested in young men," sometimes derogatory remarks of a nurse's intellectual attainments. If Mary will in four years be a skilled nurse with an eye on the marriage market, and Joan a first-class private secretary with an eye on the money market, can we say that one will represent a higher type than the other? Even suppose Joan becomes a blue stocking, will she be any better or worse than Mary? But I do admit that Mary might have more cultural interests and Joan have more real experience of human frailties. Joan's deficiencies were thought to be made good in the old days if she came and "slummed" for six weeks. I am not clear that anyone helps to broaden the cultural experience of the Marys. Nurses' libraries are improving, so are the periodicals in them—but free theatre tickets usually come for the worst and not the best plays (are there ever tickets for concerts?). Mary says she is too tired to think of much beyond nursing; Joan believes that by midnight discussions she comes to know about "life." At present the culturally interested nurse is as rare as the effectively useful blue stocking, and matrons and dons might well remember it. The nurse can chatter and gossip, the women students build new Utopias of the imagination. The latter will not necessarily make good teachers or good social workers, any more than the former can contribute to their convalescing patients' interests or their juniors' enjoyment of art (in its widest sense).

The don is a person of authority in her own right. Is the sister? I am inclined to believe that in general she is not. Exceptions there certainly are, but I can't help feeling that what prevents Joan being a nurse (and her mother was a good one) is that she senses that a university career will lead on to something more creative than Mary's career. Mary will ultimately be responsible to a doctor. This is not the freedom towards which Joan is attracted. Nursing is a pseudo-profession remaining the handmaid of the medical profession. It attracts, therefore, not only those who are delighted in its scope but those who shelter under its wings. We know the latter type of doctor. Our view of the nurse may need altering—our attitude to her certainly does.

* * *

He is registered as a rabbit-trapper but might with equal truth be described as a game-keeper or a poacher or a combination of all three; a little lean gnome-like

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creature with a brown wrinkled face looking more than his 45 years. Before and during the last war he was a serving soldier. During the troubles in Ireland he was taken prisoner by Sinn Feiners and told every night for a week that he was to be executed next morning. Such things try a man so he knocked the sentry out with a candlestick and made a dash for it, escaping with nothing worse than a deflected septum. He has been a great runner in his time at all distances up to a mile. He even won an inter-Services cross-country race when he had been made so tight beforehand by his admirers that he had to stop and vomit at intervals during the contest. Not so long ago he and his two growing sons, who have inherited his fleetness, shared all the prizes at a small athletic meeting. He has also tried his hand as a jockey and played soccer and boxed for the Army. As a gamekeeper he has had many a heroic encounter with poachers and diddekis (as he calls gipsies) in which, if he is to be believed, he always came off best though not necessarily unscathed. He owns three scruffy little bitches; two spaniels and an elderly fox-terrier. They all look hungry but are happy, obedient and obviously devoted to him. To see him handle ferrets and fitches is a lesson in deftness; if they won't go down a hole he kicks their noses gently or flicks them in with his cap; nor do they protest when picked up and carried by their tails. With pride he described how the old terrier bitch had fought two foxes and two badgers in an earth for 36 hours on end and then had to be dragged off. In some ways he himself resembles a terrier especially when he has his ear to the ground over a "burry." Very handy with a shotgun he is and kills 8000 rabbits a year mostly by shooting. He claims to be the only man in England to have been shot at by a rabbit. It seems that one day he laid his loaded gun down in a ditch while he went to pick up a ferret. Simultaneously a bolted rabbit jumped out on to the triggers and fired the gun; but the rabbit missed and did not stay to give him the other barrel. Uncivilised you might call him, but undoubtedly a happy and well-adjusted person. He has a very nice set of teeth but only wears them on ceremonial occasions.

Reviews of Books

Principles and Practice of Chromatography

L. ZECHMEISTER, California Institute of Technology; and L. CHOLNOKY, lecturer at the chemical institute, University of Pécs, Hungary. London: Chapman and Hall. Pp. 362. 25*s*.

CHROMATOGRAPHY is based on the fact that different substances in the same solution, when brought into contact with an adsorbing substance, are adsorbed to different degrees. The technique was devised and developed by the Russian botanist Tswett in the first decade of this century; but only in the last ten years has it become popular. The method is to run the solution slowly through a tube packed with adsorbent, when the substances are adsorbed, not evenly but in separate rings, forming a "chromatogram." This is "developed" by passing pure solvent through the column, when the rings of adsorbed substance travel farther down and move wider apart. The different substances are then recovered separately from the adsorbent, in one of two ways. The column may be removed from the tube, cut up so as to separate the rings or groups of rings, and the adsorbed substances eluted by suitable solvents from each portion of adsorbent; alternatively, the adsorbent is left in situ, and the different substances eluted separately by different solvents, or skilful use of a single solvent. The method has great scope. Aqueous or organic solvents may be used. There is a wide range of adsorbents—alumina, lime and sugar being common ones. As to the adsorbable substances, it is naturally easiest to work with those which are brightly coloured; but methods have been developed for the chromatography of colourless compounds. Thus a pigment may be added which is adsorbed to the same degree as the colourless substance; or the latter may be converted into a coloured derivative; or the chromatogram may become visible in ultraviolet light. Chromatography is widely used for the separation of mixtures, for testing the homogeneity of a substance or the identity of two substances, or for the concentration of a substance occurring naturally in great dilution. Biochemists employ it to isolate vitamins and hormones from their natural sources and to separate carotenoids from serum; pharmacists, for the assay of alkaloids in tinctures, and of vitamins A and D in fish oils, or for the detection of added dyestuffs in food and wines.

Professor Zechmeister and Dr. Cholnoky have made wide and significant contributions to the subject. Mr. A. L. Bacharach and Mr. F. A. Robinson are to be congratulated on a fine translation; and they have included some valuable hints on obtaining suitable adsorbents in England. It is a pity that the excellent photographs could not be in colour.

Common Skin Diseases

(6th ed.) A. C. ROXBURGH, M.D. Camb., F.R.C.P. London: H. K. Lewis and Co. Pp. 436. 16*s*.

THIS medical best-seller has been brought up to date and sections on thorium X and dermatomyositis have been added. The section on the treatment of scabies has been revised and it is noteworthy that, while describing more modern methods in detail, the author still adheres to the view that sulphur ointment properly applied will always cure scabies. He describes two clinical types of impetigo, and over the vexed question of whether it is streptococcal or staphylococcal in origin he remains moderate. No stress is laid on the differential diagnosis between impetigo and impetiginised seborrhœic dermatitis of the face, which is important from the point of view of treatment. The book finishes with a short section on the avitaminoses which suggests, quite accurately, that our knowledge of the relationship between vitamin deficiencies and diseases of the skin is still rather vague.

Dental Materia Medica, Pharmacology and Therapeutics

(2nd ed.) WALTER J. DILLING, M.B. Aberd., and SAMUEL HALLAM, L.D.S. R.C.S. London: Cassell and Co. Pp. 348. 13*s*. 6*d*.

A SECOND edition of this excellent handbook is welcome. A book on pharmacology must be kept up to date to be of practical value, and the authors have spared no pains in revision. The new accounts of the sulphanilamides, antiseptic dyes, buffered local anæsthetics and of the analeptics are well done, and the section on vitamins, which incorporates the recent advance in knowledge, particularly regarding P, E and K, is helpful. The work on premedication is clear and concise, though not all will agree that it is wise for a dentist to use many of the drugs except in collaboration with the patient's doctor. Professor Dilling points out that unusual symptoms in procaine hydrochloride injection are generally due to the rapid absorption of adrenaline which procaine promotes, though to a less extent than cocaine. For years many dentists have recognised this from clinical evidence, but the hypodermic preparations still contain adrenaline. The first-rate therapeutic notes in this book make it a real clinical guide.

Cardiac Classics

F. A. WILLIUS, M.D., chief of the section of cardiology, Mayo Clinic; and T. E. KEYS, M.A., reference librarian at the Clinic; London: Henry Kimpton. Pp. 858. 50*s*.

IN the attempt to keep pace with present developments the original writings of the historical giants of medicine are seldom read except by librarians and bookworms. But many classical papers teach lessons in observation and lucid expression from which any member of the profession may profit. We warmly welcome, therefore, this collection of 52 papers by 51 authors whose work in the past three centuries has done most to further knowledge of the circulation. In the first paper—Harvey's "De Motu Cordis," which is reproduced in full—the superbly simple experiment to demonstrate the direction of blood flow in the veins of the arm, which reversed previous conceptions, is a perfect example of observation and description. The last paper, by J. B. Herrick who is still with us, contains the first clinical picture of coronary thrombosis. Other contemporaries "must remain patient until some future compilers honor them." A short biography of each author is appended; 27 of the 51 are British.

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THE LANCET

LONDON: SATURDAY, DECEMBER 13, 1941

QUARANTINE AND MAN POWER

THE Post Office, with its 260,000 workers, is the largest employer of labour in the country. Its well-organised medical branch is as qualified to comment on the health of the adult workers as is the school medical service on the health of the child. In this issue Dr. W. L. SCOTT records impressive figures vindicating the policy of the Post Office in allowing healthy contacts of infectious diseases to remain at work. There is nothing new in the procedure, whether applied to school-children or adult workers; nor is rigid, indiscriminate quarantine for contacts in hospital wards practised today by experienced administrators. But, though the Post Office has been employing this policy with conspicuous success for over 30 years, there are still many industrial concerns, units of the fighting and other services, and educational authorities which insist on exclusion of healthy contacts from work or school; many hospital beds are temporarily lost and many patients unnecessarily detained because of the imposition of rigid quarantine. The cost to the country must be enormous and the time is opportune to review the position.

Quarantine, as applied to persons, is the limitation of the freedom of contacts to mix with others until it is certain they have not contracted the disease to which they have been exposed. In its most rigid application contacts are segregated for the longest usual incubation period of the disease, and it is worth remembering that some of the mildest infections have the longest incubation periods. A modified procedure consists in excluding contacts from school or work without, be it noted, controlling their movement or company during their enforced absence. A serious criticism of this method is that school-children, compelled to remain at home, play with their younger siblings of pre-school age who are much more susceptible than children at school. Instead of adopting either of these measures, we may allow the contact to remain at work or school provided he is kept under observation. The first examination of the contact, preferably made by the medical practitioner in attendance on the patient, serves to detect missed and abortive cases and chronic carriers. The Post Office require their medical officer to carry out such an examination in the case of contacts of diphtheria and scarlet fever. Subsequent daily observation during the incubation period aims at detecting the earliest symptoms of the disease. In the case of school-children it is conveniently left to the school teacher or school nurse, if a doctor is not in daily attendance. Adults can report the appearance of symptoms and daily observation is not necessary except in special circumstances. Boys and girls in the Post Office are kept under observation by their supervising officers.

Any procedure which experience shows to be efficient for the control of infectious diseases among school-children, with their greater susceptibility and more frequent exposures, should be adequate for the more immune adult. It is therefore pertinent to note that in the official code[1] quarantine of contacts is recommended for one disease only—smallpox. (To this exception the Post Office add plague, typhus and cholera—diseases omitted from the "no quarantine" code because of their rarity.) This policy has been extensively adopted in public and county schools. Medical officers of health[2] and school medical officers who have used the method rarely if ever have recourse to "school exclusion" and its more extensive application "school closure." It could therefore be anticipated that results among adults would be even more favourable. SCOTT'S paper confirms this expectation and is of particular value because statistics bearing on this subject are scanty. A follow-up over 10 years showed that of 17,844 contacts of scarlet fever, 1 in 251 (0·39%) subsequently developed the disease. This figure fell to 1 in 431 (0·22%) when the very modified quarantine was abolished. Corresponding figures[3] for other diseases during the same period were:—

	No. of contacts	*Subsequently developed the disease*
Diphtheria	7,000	1 in 774 (0·13%)
Measles	17,000+	1 in 670 (0·15%)
Chickenpox	7,000	1 in 218 (0·46%)
Mumps	3,000+	1 in 101 (1%)

Interesting as these figures are as evidence of the slight danger to adult contacts, they are not so important as the number of employees who contracted the disease from contacts, for it is to avoid such spread that quarantine is imposed. SCOTT[4] in an earlier paper showed that there was no recorded case of a healthy contact transmitting any of the infectious diseases scheduled by the Post Office. This conforms with the modern view that the dangerous disseminators of infectious diseases are chronic carriers, missed and abortive cases; by comparison the healthy contact plays an insignificant part. In hospital practice there is wide variation in the use which is made of this and other modern knowledge in the management of contacts. There are still many hospital authorities which, on the appearance of a single case of infectious disease, impose rigid quarantine without regard to the seriousness and infectivity of the disease, the age of the contact or his state of immunity. Consideration of these factors would permit the release of a high percentage of hospital contacts. It must, however, be admitted that advice sufficiently definite to be of value to those without special knowledge of infectious diseases is extremely scarce in medical literature.

In a country at total war the importance of SCOTT'S paper is that it provides convincing evidence of the enormous loss of healthy man-power for which the old method of quarantine is responsible. When modified quarantine for contacts of scarlet fever was the Post Office rule, it resulted in a loss of one working day for each contact, and a total annual loss of 5·2 man-years. Had the usual quarantine period of 7 days been imposed, the loss would have been equivalent to about 35 man-years per annum. Loss of working time is today the vital concern not only of the individual worker or employer but of the nation. Let us offer the MINISTER of LABOUR a present next year of 35 man-years of labour for every quarter of a million

1. A Code of Rules for the Prevention of Communicable Diseases in Schools issued by the Medical Officers of Schools Association. 10th ed. 1940. London: J. A. Churchill.
2. See *Publ. Hlth*, 1937–8, **51**, 203 for discussion.
3. Provided by Sir Henry Bashford. 4. *Lancet*, 1937, **2**, 397.

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workers who, at present, are excluded from work if they become contacts of scarlet fever; and then offer to throw in all the man-years which can be saved among contacts of other infectious diseases. Experience in the Post Office shows that it can be done. Medical advisers to all government departments, local authorities and industrial concerns should forthwith review their instructions or advice on the management of contacts, and thereby make a handsome contribution to the war effort. "Inquiry may be made at the Post Office."

THE LIMB ON ICE

THE principle of refrigeration is no new one in medicine. As long ago as 1852 JAMES ARNOTT [1] was advising the use of a "benumbing and congealing temperature," to produce local anæsthesia for surgery and to relieve the pain of trigeminal neuralgia and lumbago; for all of which purposes he seems to have found it uncommonly good. For the past ten years F. M. ALLEN of New York has been studying the effect of cooling on limbs rendered ischæmic by ligation of vessels, by tourniquets or by vascular accidents. Few will quarrel with his conclusion that, when the circulation in a limb is impaired, survival is aided by cold rather than heat; for cold, by reducing the metabolism of the tissues, cuts down the oxygen requirements and thus offsets the diminished blood-supply. Moreover, cold arrests the growth of pathogenic organisms and in the ischæmic limb this may make the difference between life and death. In animal experiments ALLEN finds that the survival of limbs cut off from the circulation by a tourniquet is greatly prolonged by cooling, which also lessens the risk of death on sudden release of the tourniquet. He suggests that in cases of embolism prompt cooling could extend the period in which embolectomy could be performed well beyond four hours. In his latest paper,[2] which is chiefly concerned with diabetic gangrene, he claims that the tourniquet and cooling can produce anæsthesia adequate for a major amputation, and that the method allows the operation to be delayed while the patient's general condition is being improved. His aim is not to freeze the limb but to keep it at a temperature round about 5° C., which he achieves by immersing it in ice water, resting it on a solid block of ice, or packing it round with thin flexible bags containing a freezing mixture. The tourniquet is applied 5–15 minutes after cooling has been begun, by which time the skin is so much chilled that the application causes scarcely any discomfort. Two turns of a rubber tube are used and the tension should be the least that will stop all blood-flow. The limb is afterwards buried in ice-bags to a level several inches above the tourniquet. Pain and discomfort, it seems, quickly subside in the chilled limb and ALLEN regards anæsthesia so produced as being fundamentally different from the nerve anæsthesia achieved by anæsthetic drugs. Chilling produces what he calls "anæsthesia of protoplasm"; the term is vague since anæsthesia merely means absence of feeling, and feeling is the prerogative of the sensorium. It is easier to think of refrigeration as inhibiting all protoplasmic activity including that of the nerve-endings. ALLEN considers that it inhibits the shock response as well and that the surgeon thus has the advantage of working in a bloodless shockless field.

The time needed to achieve sufficient anæsthesia for operation varies with the depth of the tissue to be cooled; he puts it at 1 hour for an emaciated shin and as much as 5 hours for a thick thigh and states that if it is not possible to cut the sciatic nerve at mid-thigh without attracting the notice of the conscious patient and without any change in pulse or blood-pressure there is something wrong in the method of preparation. Operation is performed below the tourniquet, which is not removed until the wound is ready for closure. Bleeding points are then ligated and anæsthesia persists long enough for suturing to be completed. During aftercare the temperature of the limb can be raised by stages to normal level. There is no objection, he says, to letting the stump return to normal temperature at once, but by maintaining the chilling several new controls come into play. Thus, where poor blood-supply leads to a threat of sloughing in flaps or injured tissues, cooling makes it possible to reduce the oxygen demand to meet the supply. Or when the operation, shockless itself, has left damaged tissues which might produce postoperative shock, the danger period can be bridged by cooling. In a similar way cooling combined with the application of a tourniquet, he finds, makes it possible to postpone operation in a feeble or toxic patient. In such cases chilling is begun on admission and a tourniquet is applied at once and left in position for several days, while the patient is brought to a fit state to withstand operation. If the tourniquet has been in place for more than a day it must on no account be removed or allowed to slip. A few hours before operation another tourniquet is applied an inch or two above the original one, and amputation is performed between the two. ALLEN suggests that the method might have an important application in war wounds, and MCELVENNY [3] reports a case which seems to support this contention.

A man of 50 had had both legs amputated by a train, and when seen an hour afterwards had had tourniquets applied to both thighs and was exsanguinated and profoundly shocked, with a blood-pressure of 30/0 mm. Hg. He was transfused, the tourniquets were released, bleeding points were picked up, and the stumps were wrapped in gauze soaked in sulphanilamide. Eight hours after injury his blood-pressure had risen to 50/10 mm. Hg. Mud and sand had been ground into the stumps, which were macerated and ragged. Within 20 hours of the accident he had developed pneumonia and a foul odour was coming from his wounds. His temperature rose to 101° F. and his blood-pressure did not improve. He was given sulphapyridine and azosulphamide (Neoprontosil). At this stage the lower limbs were packed in ice to 2 in. above the level of tissue injury. Pain ceased within an hour, and soon afterwards the foul odour vanished, and the patient who had been delirious became rational. He was given three doses of prophylactic combined sera and another transfusion. He continued to improve and 58 hours after injury his blood-pressure was 110/60 mm. Hg with temperature 101° F.; bilateral amputation was now carried out under ethylene anæsthesia, and he was transfused on the table. The muscles in the amputated limb were found to be in good condition, and the stumps healed with no induration, sloughing of skin or other tissue, or signs of infection. The day after operation the patient had his pneumonia crisis, and subsequently made an uneventful recovery.

The multiple treatments given make it impossible to assess the part played by cooling in this case, but

1. Arnott, J. On benumbing cold, as a preventive of pain and inflammation from surgical operations with minute directions for its use. London: J. Churchill. 1854.
2. Allen, F. M. *Amer. J. Surg.* 1941, **52**, 225.
3. McElvenny, R. T. *Surg. Gynec. Obstet.* 1941, **73**, 263.

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it seems to have helped to combat shock and it certainly stopped local pain and got rid of smell from the stumps. It is noteworthy that pieces of skin which had not been included in the ice were gangrenous, whereas equally detached pieces which had been cooled were well preserved. These results deserve to be considered in relation to severely damaged limbs in both war and civil injuries. Cooling might play a useful part when the number of the casualties outstrips the capacity of the operating teams, and lives are lost because patients cannot be brought to the table within the optimum period. Of theoretical interest is its possible application to crush injuries, mentioned in the discussion at the R.S.M. reported on another page. The chance of a crushed limb surviving appears to be greater if it is cooled, and the onset of signs of nerve injury in cooled limbs is said to be greatly delayed. ALLEN has shown experimentally that it is possible to retain a tourniquet for a long time on a cooled limb when the presence of injected poisons, such as strychnine, make its removal unsafe except for very short periods; thus if so-called crush syndrome is due to circulation of poisons elaborated in the crushed tissues the use of cooling and of a tourniquet with graded periods of release might prove effective treatment. Amputation for crush syndrome can only be justified to save life, for in many cases the survival of the crushed tissues is not in doubt. Much of ALLEN'S writing is speculative, and not all his opinions carry conviction; but he has attempted to test his ideas by experiment and his findings certainly merit further study.

VACCINATION AGAINST INFLUENZA

VACCINES made from living or inactivated influenza A virus are effective in immunising laboratory animals, and we know a good deal about the conditions governing success. Attempts to apply this knowledge to the protection of human beings have yielded no conclusive results, mainly because an influenza outbreak has not hitherto been obliging enough to attack a vaccinated community at an appropriate interval after vaccination. Now at last comes news from the United States which provides us with real information on this question. HORSFALL, LENNETTE and RICKARD [1] have lately described an influenza A virus vaccine made by growing the virus in developing eggs and then inactivating it with formaldehyde. This vaccine was given [2] to nearly 8000 people in 15 institutions in the Southern States, about 40% of each institution being inoculated and the rest serving as controls. HORSFALL and his co-workers were lucky in that an outbreak of influenza, mainly due to A virus, occurred in 10 of these institutions about four months later. In 4 of these they used a batch of vaccine which proved in laboratory tests to be of much poorer quality than the others; the people who received vaccine from this batch showed little if any evidence of protection. Among 3455 people receiving other batches, 193 cases of "clinical" influenza occurred. Serological studies on 137 of these persons indicated that 81 of them had presumably suffered from influenza A, the incidence being 3·3%; this contrasts with a corresponding figure of 6·6% for the control group. Thus the vaccine, of which a single subcutaneous dose of 1 c.cm. had been given, appeared to halve the incidence of influenza A. Mixed with the influenza A cases were smaller numbers of cases of "clinical influenza" not due to virus A; the incidence of such cases was virtually unaffected by the vaccination. If all the cases of "clinical influenza" of whatever cause are lumped together, the reduction of incidence by vaccination seems to have been from 8·3% to 5·6%.

These results are particularly interesting if read in conjunction with a paper by the same authors [3] on the correlation between neutralising antibodies and susceptibility to influenza. Almost all adults have some antibodies against influenza A virus in their sera and it has been known for some years that vaccination with formolised virus will increase the titre of such antibodies. Whether or not this is a worthy aim obviously depends on whether possession of potent antibodies affords significant protection against the disease. The American workers examined 1321 normal people serologically and classified them into groups having different antibody levels; they then observed the influenza attack-rate in the different groups in the following months. It appeared that a high antibody titre against A virus renders you less liable to attack by that virus, but not enormously so. If you are in the most favourable group, which contains only 2·7% of the community, your chances of escaping flu are only five times better than the average, while however poor your antibodies you are only about twice as susceptible to flu as the average. It thus seems that antibody level is only one factor determining resistance to influenza A; doubtless the size of the dose of virus reaching your respiratory tract is another. From the known effects of vaccination on antibody level, and the relationship between antibody level and immunity, it is possible to predict what reduction in incidence should be achieved by vaccination. Such calculation does not encourage hope that use of the existing vaccine will produce more than a 30% reduction in persons exposed four months after vaccination. After a shorter interval protection should be rather better and after longer periods rather worse. Actually the American trials showed a 50% reduction, somewhat better than that expected. It may be hoped that improved vaccines will give bigger antibody rises and better protection; but since first-class antibodies only promise the individual moderate protection, we cannot hope that progress along these lines will ever guarantee him immunity. An epidemiological outlook is perhaps more hopeful. Future investigators may look aside from the individual and consider the relation between the average antibody level of the community and the likelihood of an epidemic. If epidemics do not occur when this level is high, vaccination of all or nearly all of a closed community might produce excellent results, though the benefit would be difficult to prove conclusively.

One aspect of Horsfall and Lennette's vaccine cannot yet be pronounced on. Following up some remarkable and at present inexplicable findings in ferrets, they made their vaccine by infecting eggs simultaneously with the viruses of influenza A and

1. Horsfall, F. L. jun., Lennette, E. H. and Rickard, E. R. *J. exp. Med.* 1941, **73**, 335.
2. Horsfall, Lennette, Rickard and Hirst, G. K. *Publ. Hlth Rep., Wash.* 1941, **56**, 1863.
3. *Ibid*, p. 1819.

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a particular strain of dog distemper. It is hard to see why this should have worked. MARTIN and EATON [4] in California compared the effect of this "complex vaccine" with that of one they made with influenza A virus alone. The two seemed equally good; in one institution each reduced the incidence of the disease by more than half in the vaccinated group, while in another institution the results obtained were not impressive with either vaccine. The rôle of the distemper virus in the complex vaccine is thus doubtful. It must be added that the antibody response produced in man by Horsfall and Lennette's vaccine is of the same order as that caused by the formolised mouse-lung vaccine which has been described from this country.[5] The worth of this, for reasons already mentioned, has been neither proved nor disproved. It will be obvious, however, that a vaccine can be made more readily and on a larger scale from chick embryos than from mouse-lungs—even, we imagine, in "beleagured island fortresses" such as ours.

Annotations

THE GLYPH'S FUNERAL

PERHAPS from indolence, but more probably on account of an obsession inherent in every one of us, familiarity with a subject leads to the increasing use of abbreviations. No trade or profession is entirely free from them. The Forces are among the worst offenders, but even the Cloth is not blameless, as a glance at Cruden will testify. Again no sooner have we learnt to write legibly than we slip imperceptibly into the reprehensible habit of trailing our words into nothingness. The pathogenesis of the decay in calligraphy is still in dispute, but it is significant that when the subject is discussed in public the plight of the physicians rarely goes unnoticed. Our hieroglyphics have become a standing joke in the music-halls while pharmaceutical students submit with good grace to a course of instruction on the reading of "illegible" prescriptions. Even within our own ranks we can hardly deny that the combination of dog Latin, freakish handwriting and bizarre symbols has brought us to a pretty pass. This cult of medical obscurantism almost certainly originated in a desire to create an atmosphere of erudition otherwise difficult to achieve, and at the same time to bamboozle patients who are intelligent enough to show an interest in the names of drugs which they have been instructed to swallow. That the practice of illegible prescribing is a vicious one and fraught with potential danger to the patient has been recognised in Scandinavian countries where offenders are liable to imprisonment without the option of a fine. "Depend upon it, sir," said Dr. Johnson, "when a man knows he is to be hanged in a fortnight, it concentrates the mind wonderfully." It may be that nothing short of a smart penalty will remedy the present state of affairs, but there are one or two reforms which could be effected without delay. In the first place, prescriptions should be written in English. With rare exceptions the Latin which is now used would bring a blush to the cheek of a fourth-form boy. And the banishment of our grotesque symbols ℈, ʒ and ℥ is long overdue, however fond we may be of them. When these curious markings have degenerated into mere zig-zags—a process which seems inevitable when a doctor takes a pencil in his hand—the drachm sign may be mistaken for the ounce and an eightfold dose given in error. Thus a patient who should have had six drachms of paraldehyde was actually given six fluid ounces by a nurse, and a man's life was thrown away.[1] The B.P. and now the N.W.F. recommend that quantities of solids should be expressed in grains (gr.) and ounces (oz.). Here the ounce is avoirdupois and is equal to 437·5 grains. Volumes of fluids should be stated in minims (min.) and fluid ounces (fl. oz.). It may be objected that "min." might be confused with minutes (5 min. castor oil every 20 min.), but the context should obviate this difficulty. The National War Formulary recommends a capital G as the symbol for gramme. This will differentiate even more clearly between grain (gr.) and gramme (g.), and will eliminate the uncertainty which arises from unconventional abbreviations such as grn. and grm. To make doubly certain it might be well to retain the traditional practice of writing min. (for minim) and gr. (for grain) before the numeral and min. (for minute) and g. or G. (for gramme) after it. Roman figures too have long been a curse to the dispenser; they are an anachronism which should no longer be tolerated. Mistakes are far less likely to happen when Arabic numerals are employed. A recognised code of abbreviations is highly desirable, and the B.P. and N.W.F. have shown how easily it might be acquired by every practising doctor. Only custom and apathy stand in the way. Now that the season is at hand for turning over new leaves, we might resolve to lighten the dispenser's task by prescribing accurately, legibly and simply.

PLASMA URIC ACID IN ECLAMPSIA

IT has long been known that the plasma uric acid is raised in eclampsia, sometimes to 15 mg. per 100 c.cm. or even higher. The reason for this rise has hitherto not been clear, but there has been a general opinion that it is part of the metabolic disturbance due to the "toxæmia." M. D. Crawford[2] has now made a careful study of the subject, following individual patients through the stages before the onset of eclampsia and then through the convulsive phase and for some days after. Analysis of the findings reveals three basic factors. The factor which comes first in time is the severity of the preceding hypertensive toxæmia. This requires a preliminary consideration of the findings in patients who are not destined to have any convulsions. During the last few days of pregnancy the mean plasma uric acid in normal women is 3·9 mg., in women with mild toxæmia it is 4·4 mg., and in women with severe toxæmia it is 6·4 mg. per 100 c.cm. It might reasonably be expected that a patient who is on the verge of developing eclamptic convulsions would have an even higher uric acid, but this is not so. If she has few or no symptoms before the onset of fits her uric acid is normal; if she has severe previous symptoms her uric acid is moderately raised but is usually below 6 mg. From the present figures it appears probable that a severely toxæmic patient is not in danger of eclampsia if her uric acid is in the range of 6·5–9·7 mg. The second factor is the effect of the convulsions themselves. If the patient has a single fit, her uric acid rises about 1 mg. in the next hour and then more slowly for the next few hours. The greater the number of fits the greater the rise, so that a patient who has a dozen fits has a uric acid about 6 mg. above the initial level within 6 hours after the onset of the fits. The high level is maintained for 6–24 hours and the uric acid then falls at about 0·5 to 1 mg. per day, the rate of fall depending on the type of eclampsia and the degree of oliguria. The same type of rise was found by Crawford to follow convulsions produced artificially in non-pregnant patients for the treatment of various psychoses, and also similar convulsions produced experimentally in rabbits. The second factor thus appears to be the muscular effort of the convulsions. It accounts for most of the elevation of uric acid found in patients brought into hospital after the eclampsia has begun. The third factor is the duration of labour.

4. Martin, W. P. and Eaton, M. D. *Proc. Soc. exp. Biol. N.Y.* 1941, 47, 405.
5. Andrewes, C. H. and Smith, W. *Brit. J. exp. Path.* 1937, 18, 43.

1. See *Lancet*, 1936, 1, 623. 2. *J. Obstet. Gynæc.* 1941, 48, 60.

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Crawford[3] has shown already that the plasma uric acid rises about 0·06 mg. for every hour the patient is in labour, and falls to its previous level within 2 or 3 days after delivery. In a long labour this factor can lead to a considerable rise of uric acid. These three factors are independent of each other, and their combined effect is obtained by simple addition. The initial level in the eclamptic patient is governed by the severity of the preliminary toxæmia. After this there are two curves, one due to the convulsions and the other to the labour. These are superimposed on each other, the relative position of the two curves depending on whether the eclampsia is ante-, intra- or post-partum. Given full clinical details, it is thus possible to calculate the course of the plasma uric acid in an eclamptic patient with reasonable accuracy. This work clears away most of the problems about the rise of the uric acid in true eclampsia. It leave two points unexplained: the raised level which is usually found in severe hypertensive toxæmias before labour, and the relatively low level in eclamptic patients before the fits begin.

FEEDING THE NEWBORN BABY

IT is generally agreed that the great fall in infant mortality this century has largely depended on improved feeding methods and Dr. Helen Mackay[4] thinks that the neonatal death-rate, which has remained obstinately high, could also be materially lowered by better feeding. To this end she has set out her views on the day-to-day caloric requirements of newborn babies and suggested a formula whereby their food intake can be regulated. From the available figures Mackay puts the caloric value of early human milk and of colostrum at 20 per fluid ounce. She also takes this as the caloric value for breast milk after lactation is established and all the artificial feeds she uses are adjusted to give the same figure of 20 calories per fl. oz. Her next assumption is the customary figure of 50 calories per pound body-weight per day for the average baby's needs, and according to her formula this should be reached in seven days. Thus on the first day of life a baby should receive calories equivalent to a seventh of 50 times the body-weight in pounds, on the second day two-sevenths and so on until the full 50 calorie ration is reached. She points out that the formula overestimates the intake of normal breast-fed babies during the first two days of life when breast-secretion is scanty, and rightly emphasises the importance of using these figures simply as guides and not as a rigid system. Turning from the formula to the babies concerned Mackay is able to show that with twenty healthy breast-fed babies the average intake on any one day after the first two days of life is within 3–12% of her schedule, taking those who regained their birth weight by the tenth day. A series of 107 consecutive premature babies who had their food intake checked and guided by the formula also made good progress and averaged 1 oz. over their birth weight at ten days old. For a group of 43 premature babies for whom complete figures are available it was found that their intake for the first ten days of life was within 6% of that allowed by the formula and during the second week of their life intake averaged 53 calories per pound birth weight per day—again within 6% of the formula requirement. It seems simple to apply the formula to babies who are completely artificially fed if Mackay's milk mixtures (not explained in detail in her present article) are followed, since they give 20 calories per fl. oz. The only obvious difficulty is that dividing by seven seldom gives a tidy answer. As regards supplementary feeds Mackay points out that purely mathematical considerations do not constitute the whole problem. While using the formula as a guide the maternity nurse or supervising medical practitioner must also bear in mind the sucking ability of the baby, the psychological outlook of the mother and the effect on her of a discontented or lethargic baby, the baby's behaviour during feeds, the mother's management, and the amount of milk remaining in the breast after the baby has finished a feed. It is clear, however, that by a formula such as Mackay suggests a check can be kept on the possibility of underfeeding, an all too common fault in the early days of breast-feeding and probably the commonest reason for the abandonment of breast-feeding after the mother's discharge from a maternity unit.

WASHING WITHOUT SOAP

"AVOID washing" is the usual advice given to a patient with eczema. To the patient and his doctor this means avoid soap, which irritates sensitive skins, and even normal ones if the exposure is adequate. Moreover, as Sir Almroth Wright pointed out in a popular lecture many years ago, when the epithelium of the skin is thinned by rubbing off or dissolving the superficial layers, microbes have a good seed-bed to grow on. The abrasive and strongly alkaline soaps used by workers in dyeing, chemical manufacturing and other dirty jobs predispose to dermatitis from irritants encountered at work and may produce dermatitis of their own accord. Industry, and also cosmetic merchants, have long realised that there are other cleansing agents besides soaps, for example various sulphonated oils. These act by emulsifying the dirt without taking the fat out of the skin; and their pH can be controlled. Other detergents are the synthetic wetting agents, such as the fatty alcohol sulphates; these are good cleansers with a wide variation in pH but they do tend to defat the skin and occasionally act as sensitisers. By mixing sulphonated castor oil with 2% of a wetting agent, Schwartz[1] has produced a skin cleanser which is safe to use in industry and can even be given to eczematous patients. Its disadvantages are its smell and the fact that it does not foam like soap; for these reasons some workmen object to it, especially those not actually suffering from dermatitis. This is clearly a field which deserves to be thoroughly explored, particularly at present when dermatitis may be a serious trouble among munition workers. In the home, however, one feels that it will be a long time before such preparations make much headway against the popular prejudice in favour of ordinary soap and a good lather.

HOSPITAL DESIGN

HOSPITAL construction is in a state of transition—it always is, of course. After a comparatively static period following the Nightingale era, real advances seemed to be occurring during the ten years preceding the present war; but the outbreak of war brought a lull in construction and there is now uncertainty about post-war hospital policy. We have in fact arrived at the cross-roads in the principles of hospital building and there is need for intimate discussion between doctors and architects—not to speak of nurses and patients—during the lull so that our ideas may be clarified when the time comes to build again. The position was outlined in the history of medicine section of the Royal Society of Medicine on Dec. 3 when Mr. C. E. Elcock, F.R.I.B.A., opened a discussion on "Hospital building—past, present and future." The problems fall into two groups: questions of policy such as function, size and location; and questions of architectural lay-out and detail. As to location, Dr. R. C. Harkness said that L.C.C. experience made it clear that a hospital must be in the area it is to serve if it is to be used to the full. Mr. Elcock on the other hand felt that space, freedom from noise, fresh air, sunlight and low costs weighted the scales heavily in favour of country sites. His main point, in which naturally he had the support of medical officers of health such as Dr. J. Ferguson of Surrey and Dr. W. A.

3. *Ibid*, 1939, **46**, 540. 4. *Arch. Dis. Childh.* 1941, **87**, 166.

1. Schwartz, L. *Publ. Hlth Rep., Wash.* 1941, **56**, 1788.

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Bullough of Essex, was that the building for the sick must in future be a part of a local centre for preventive as well as curative medicine. Such a scheme, in which the hospital itself would be merely a necessary detail of the whole, had been worked out at Grantham but postponed owing to the war. A new idea was embodied in the Harvard Hospital (somewhere in Wessex) which was a base for a field unit with its laboratories, combined with a hospital for infectious diseases. Mr. Elcock favoured the policy of using hospitals for education in healthful living; the building was as important as what happened inside it. As regards size it seems clear that the day of small, scattered special hospitals is over. For historical reasons, as Dr. Harkness pointed out, the isolation hospital, sanatorium, maternity hospital and so on had risen independently; there was no reason why they should not now be grouped and the isolation of their medical and nursing staffs ended. This would accentuate the importance of circulation; as many as 20 traffics might have to be considered in a modern general hospital. Mr. Elcock claimed that his continuous veranda type of ward, with beds parallel to walls, ensured a far larger amount of sunlight per patient; this had been shown experimentally at the Building Research Station and in practice at the Hertford County Hospital. On one point both architects and doctors were agreed—the need for specialisation in hospital construction by both professions. The day of the benevolent amateur is over. The local architect's plans, adapted by clinicians with the matron called in as an afterthought, produce a building which is often more cottage than hospital. The Emergency Hospital Service has revealed the need for specialist hospital officers. The effective coroner is a blend of lawyer and doctor; should not the central authority, at least, have on its staff a doctor who is qualified in architecture?

RISKS OF PARACHUTE-JUMPING

NEW methods of warfare tend to produce new types of injury as missiles and machines change, and to some extent treatment changes accordingly, although basic surgical principles remain unaltered. The pathology of parachute-jumping is the latest offspring of aviation medicine, itself so recently a lusty infant, and in what must be one of the first reviews of these injuries in English, Tobin, Cohen and Vandover[1] have surveyed the accidents occurring during the first year of parachute-training in the United States. They note that the four phases of a jump are each associated with a special group of injuries. The first arise at the time of leaving the plane and are due to entangling of equipment or failure of the parachute to open, and these are usually fatal, although in one case where the jumper got hooked to the tail of the plane he escaped with a dislocated hip. In the second phase, when the parachute opens, the shock may produce serious abdominal or thoracic injuries, a danger that may be lessened by distributing the shock over as wide an area of the body as possible. During the third stage of actual descent, diverse lesions may occur, and in this connexion Boothby, Benson and Lovelace[2] have pointed out the risk of fatal anoxia when the pilot has bailed out from over 30,000 ft. during his descent to sufficiently oxygenated air at 18,000–20,000 ft. The injuries on impact compose the fourth and by far the largest group, consisting mainly of more or less complicated injuries to the lower extremities; and fortunately these can be minimised by intensive ground-training in alighting before actual jumping is begun. In all, 2·4% of the jumps made were associated with some injury, but only a quarter required hospitalisation; 80% of these major injuries were fractures, none of them compound, half of which were malleolar, though fractures of every bone of the lower limb were recorded. Rather unexpectedly the os calcis was fractured only once. Falls on the outstretched hand resulted in an occasional fracture of the clavicle, humerus, or radial head. The frequency of malleolar fractures must be ascribed to uneven landing associated with cross-currents, unskilled guidance of the parachute, and irregular terrain, these factors combining to produce a violent temporary shearing force across the ankle-joint. The incidence of these injuries, which are of the type that tend to unfit a man for further jumping, is small, and Tobin and his colleagues attribute this to careful preliminary training in the art of jumping. This paper leads to the reflection that parachute-troops are one of the few groups of fighting-men separated from their medical services during active warfare; but perhaps this problem, too, will be solved in time.

1. Tobin, W. J., Cohen, L. J. and Vandover, J. T. *J. Amer. med. Ass.* 1941, **117**, 1318.
2. Boothby, W. M., Benson, O. O. and Lovelace, W. R. *J. Aviat. Med.* 1940, **11**, 59.

DRIED AND CONDENSED MILKS

THE deficit of liquid milk for the main body of the public owing to its welcome increased intake by children and pregnant and nursing mothers, and the large import of dried and condensed milks from the U.S.A. and Canada naturally raise the question of the relative nutritive values of these commodities. How far does condensation and drying lower the food values of milk? People who have heard that cooking destroys vitamin C rush to the conclusion that heat treatment of milk destroys *all* its nutritive value. They may take comfort from an article by S. K. Kon[1] of the National Institute for Research in Dairying in which he gives a comprehensive table of the constituents of various forms of milk and the loss of them, if any, in manufacture. The loss is remarkably small, except in vitamins B_1 and C, and since milk is of small value in supplying these vitamins it matters hardly at all from a dietetic point of view whether milk is taken pasteurised, sterilised, condensed or dried. Milk is valuable mainly for its first-class protein, its calcium and its vitamin A. It makes a substantial contribution of riboflavin but its values for vitamins C and D are low. Fortunately vitamin A and riboflavin are not reduced at all even by drying, nor is the calcium rendered less available. There is possibly some small reduction of the biological value of the proteins, but it is negligible. Even the drastic treatment of milk in spray drying destroys only 10% of its B_1 and 20% of its C. Dried and condensed milks are therefore not to be despised by anyone, and there are hygienists who look forward to the day when milk will be purchasable only at the grocers.

A SUPER DUST MAN

John Switzer Owens, whose death is announced, qualified at Trinity College, Dublin, in 1892 and took his M.D. four years later. He played truant from the Medical Directory to reappear in 1912 with high engineering qualifications as hon. secretary of the Committee for the Investigation of Atmospheric Pollution under the chairmanship of Sir Napier Shaw, director of the Meteorological Office. Of this committee our Mr. Vasey was also a member; much of the work was done in THE LANCET laboratories, and the reports appeared as supplements in our columns. Owens had the bonhomie and the drive to make any collective investigation a success, he had a vision of what England might be without smoke, and his agile mind was constantly devising new and better methods for trapping and measuring the particles of dust in the air. He was also the instigator of the Coal Smoke Abatement Society and wherever linen can now be hung out to dry without getting grimy, or the reader in a city garden can turn over the page of his novel without first blowing the smuts off it, the name of Owens should be held in honoured memory.

1. *Nature, Lond.* 1941, **148**, 607.

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Special Articles

THE ADULT SCARLET-FEVER CONTACT

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SECOND MEDICAL OFFICER TO THE POST OFFICE

IN a previous article dealing with the whole question of infectious-disease contacts (*Lancet*, 1937, 2, 397) Post Office procedure was explained, and it was shown that, from 1898 until 1937, there had been no recorded case of an employee contracting any of the Post Office scheduled infectious diseases from a contact who had been allowed to remain at work. The department is the largest single employer of labour in this country, and in 1936 the staff amounted to approximately 260,000.

The rules require a contact of smallpox, plague, typhus or cholera to remain at home until all the necessary disinfection of the premises has been carried out and the Chief Medical Officer is satisfied, after medical examination of the contact, that resumption of duty may take place with safety, if necessary under medical supervision. A contact of diphtheria is not allowed to resume duty without a medical certificate of good health. He reports for duty in the ordinary way, but before being allowed to begin work he is sent to the medical officer for examination. If a throat-swab is considered necessary, absence is allowed pending the result. Enforced absence is not required for contacts of such diseases as measles, german measles, chicken-pox, mumps, erysipelas, whooping-cough, encephalitis lethargica, enteric fever and epidemic cerebrospinal fever, unless the medical officer of health, for some local reason, advises quarantine. Each contact, however, is warned that he or she must not nurse or otherwise attend upon the invalid, but, if it is essential that any of these functions should be performed by the contact, leave is allowed without pay. Boys and girls are usually kept under the special observation of their supervising officers during the incubation period and the medical officer is consulted if they show any signs of ill health during the quarantine periods.

Up to 1937 scarlet-fever contacts were required to remain at home until the patient had been removed to hospital and disinfection carried out or had been satisfactorily isolated at home, or the contact had removed to other lodgings. For some forty years Post Office procedure as regards scarlet-fever contacts was thus in advance of its time, the full quarantine period having been reduced without ill effects to other members of the staff. During 10 years' observation (1927–36), the number of contacts of scarlet fever in the Postal Service amounted to 17,844 and of these only 1 in 251 (0·39%) developed the disease within a month of the termination of the illness of the invalid. Enforced absence from work—even with this considerably reduced quarantine period—had cost the department the equivalent of 52 working years during these 10 years, the average loss in time being 1·04 days per contact. By ordinary standards this loss was small compared to what would have been incurred had the normal quarantine period, still required by many other employers, departments, and services been insisted on.

In 1937, with the approval of the Ministry of Health, this procedure for scarlet-fever contacts was finally discontinued, and the contact is now required to report for duty in the ordinary way but, before being allowed to begin work, he or she is sent to the medical officer for a report on his or her health. This brought the treatment of contacts of scarlet fever under exactly the same procedure as had already been in force for diphtheria contacts, and the alteration in the rules was considered to be fully justified since, for all practical purposes, the staff consisted of non-susceptible adults. A small proportion of Post Office employees are recruited between the ages of 14 and 16, but the majority are between 16 and 60 years of age. Scarlet fever is a disease which mainly affects people between the ages of 9 and 15.

In view of the small numbers of contacts who subsequently developed the disease and the fact that no spread of infection had followed this long-established policy it was concluded that the risk in abolishing quarantine would be negligible. During the three years 1938–41—i.e., after the abolition of quarantine—of the 2181 reported instances of contact with scarlet fever only 1 in 431 (0·22%) subsequently fell ill of the disease within a month of the termination of the invalid's illness, and again no infection of other employees was traced to any of the contacts.

Research workers, notably Allison,[1] have within recent years demonstrated that the causative streptococcus can be isolated in a living state from dust, bedding, belongings and clothing, and it would be idle to deny that such organisms could be carried by any contact. This discovery has perhaps lent a certain amount of support to the older policy of segregating contacts. But in Post Office experience a healthy contact does not in fact convey infection in ordinary circumstances.

Naturally, local opposition to Post Office practice has occasionally been encountered from those whose views on the necessity for the full period of quarantine have undergone no change during the last half century; and inquiry has shown that in various industrial concerns, public services and departments exclusion from work of contacts of scarlet fever—often for the whole incubation period—is still the rule, but without, it should be noted, any control over what the contact may do, or with whom he may mix, while on enforced absence from his normal work. Most of such concerns are in the same position as the Post Office, that is to say, they employ or control a non-susceptible adult population; and the loss of working hours as a result of this insistence on a routine quarantine period for all contacts of scarlet fever—and often, of course, with all the other common zymotic fevers—must in total be enormous. This loss is, in the light of Post Office experience, wholly unnecessary.

CONCLUSIONS.

Post Office policy has clearly demonstrated that, provided the contact is in good health, remains under medical observation if considered necessary, and is not nursing or attending the invalid, he or she may safely go about his or her business without danger to others and without interruption. This is the basis of all infectious-disease procedure approved by the Ministry of Health, and it seems desirable, especially now when man-power is so important, that the bogy of the adult scarlet-fever contact should finally be laid.

I am indebted to all those who have assisted in the preparation of these figures, and particularly to Miss D. A. Neale of the Medical Branch.

LIGHT ON CORTICAL FUNCTION

THAT a man may lose a considerable amount of brain tissue without gross deterioration of intelligence is an old observation. Even removal of an entire hemisphere on account of neoplasm need not lead to incapacitating mental changes. Four cases of the kind have been reported by Karnosh and Gardner [2] this year, two of the patients being women and two men; one woman died 29 days after the operation from meningitis, one died of a fall 18 months later, and the two men are surviving. The right hemisphere was removed in each case, and speech was affected in none, although one of the patients was left-handed. The more outstanding physical results of the operation were left hemiplegia and left hemianopsia, but other more trifling residues—such as defective sense of smell—were easily detected. The mental changes were more elusive; the patients on recovery were alert and more vivacious than before, quick in facetious repartee, but all showed wide mood swings and found it difficult to concentrate and to carry out deliberate and protracted mental processes. The woman who died of a fall was regarded by her family as almost normal; yet they spared her all responsibility and she was not called upon to initiate any new programmes for herself or others. One of the surviving men was a restaurant keeper who after the operation lost his keen interest in his business, disposed of serious matters with a shrug and was not greatly concerned by the financial affairs of his family; yet he seemed much as usual otherwise, except for an increase in his natural high spirits. The other man was definitely changed for the worse; he became coarse in his conversation and untidy in his dress, made no attempt to return to his

1. Allison, V. D. *Lancet*, 1938, 1, 1067.
2. Karnosh, L. J. and Gardner, W. J. *Cleveland Clin. Quart.* 1941, 8, 94.

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previous occupation of book-keeping and though full of grandiose schemes failed in several small projects financed by his parents because, after a burst of enthusiasm at the outset, he lost interest in a few weeks and failed to carry on.

These findings seem to fall into line with observations now being made on patients treated for chronic mental disease by prefrontal leucotomy. This, though much less destructive, of course, than removal of an entire hemisphere, is a bilateral operation and there can be no question of one hemisphere taking over immediately functions lost by the other. An account of eight cases of this operation (which consists in division of the subcortical fibres of both frontal lobes) was reported recently in our columns [3] by Hutton, Fleming and Fox. At a meeting of the Royal Medico-Psychological Association on Nov. 26, Dr. Lilian Hutton described the personality changes in several of the 15 patients so far treated by prefrontal leucotomy in connexion with the Burden Neurological Institute. When they recover from the operation these patients may show no intellectual defect as judged by ordinary tests: they may still give an intelligence quotient of 100 or more. But specially devised tests seem to show that they have lost the power of initiating stimuli within themselves, though they respond as readily as ever to external stimuli. She described the case of a man with obsessional ideas of unworthiness; Dr. R. S. Hodge who had been first consulted by this patient told how at the interview the man had refused a confortable chair, had fetched himself a hard one and, sitting on the edge of it and wringing his hands, had talked of his unkindness and wickedness. On leaving, he had returned to the waiting-room and swept up the cigarette ash he had dropped on the carpet. Months later, after the operation, he had come again, cheerful and active and in full control of his affairs. The patient talked enthusiastically of his recovery; but on his way out caught sight of the waiting-room door and darted in. After a moment he came out grinning; he said "I still do that kind of thing, but"—tapping his chest—"it no longer hurts me here." The sight of the waiting-room door, Dr. Hutton thought, was the stimulus setting in train the old obsessional act; but she believes that, lacking their former emotional accompaniment such acts will gradually fade out, especially since they are no longer initiated spontaneously but require an external stimulus to provoke them. Dr. Hutton described how this man had responded to a series of well-known phrases both before and after treatment. Before his operation the words "Send us victorious" had caused him to finish the verse and then go on immediately "I'm possessed by myself." Similar phrases produced a momentary response followed by an immediate return to the obsessions and images which were engrossing his attention. After the operation, when the initial symptoms had subsided, the phrase recalled to him a visit of the King to France during the last war. When the stimulus was provided, then, he could respond with the appropriate memories and recount them amusingly; thus his relatives saw little change in his personality except for the better. Nevertheless he had lost some capacity for abstract thinking, as was clear when he was asked to say what he meant by a dog. His first reply was "A dog is a dog. What more can I say"? But after a little help and encouragement he said "Well a dog has four legs. It might be black or brown. It might be a hunting dog or a house dog." Thus he described a series of dogs in concrete terms, but made no attempt to give an abstract conception of a dog. This suggested to Colonel P. K. McCowan that the condition produced was a mild dementia, and to Prof. J. H. Macdonald that the effect of the operation was merely to make the patient more amenable and tractable, but to rob him of the power of discrimination and selection from past experience which distinguishes man from the ape. Dr. Hutton felt that it was impossible to describe as dementia a state in which the subject could achieve his normal I.Q.

In speaking of the mechanism of the change she trod among quicksands and was justly tentative. She suggested that we can only bring an object into the perceptual field of the appropriate sense or senses by making the necessary movements of adjustment—we turn the eye to an object and focus it, for example; and as we do this we attend to the object. We are able to maintain or recall images, she thinks, by reproducing or recalling the movements necessary for the original perception of such images, an in this way we are increasingly able to recall the past and anticipate the future. In the chronic types of mental disorder treated by prefrontal leucotomy —melancholia, anxiety states, obsessional and compulsive neuroses and schizophrenia—the patient's attention is devoted almost exclusively to maintaining the ideas and images out of which he creates his illusory world; he does not attend fully to the real world. If the maintenance of his ideas and images depends on recall of the muscular adjustments which were necessary at their original inception, division of pathways concerned with organised movement in the prefrontal lobe has a rational basis. With those pathways divided the patient is at liberty to respond to ideas and images prompted directly by the environment—to attend to reality—and his behaviour will therefore be more appropriate. Dr. F. L. Golla suggested that a late study of these cases may show that the disability due to loss of spontaneity and initiative becomes modified. The central nervous system is labile, and if some tracts are cut others tend to take over their functions; the neurons are not reconstituted, but the patient learns new ways of performing old tasks.

3. Hutton, E. L., Fleming, G. W. T. H., Fox, F. E. *Lancet*, 1941, 2, 3.

REVISED B.P.C. FORMULÆ

A SUPPLEMENT to the B.P.C. 1934 brings the formulæ in part 3 into line with the four addenda to the B.P. 1932 and with the recommendations of the Therapeutic Requirements Committee and the N.W.F. Most of the changes made aim at economy in flavouring agents, glycerin, sugar, alcohol (tinctures), olive oil, lard, liquid paraffin, and so on, but many new formulæ have been added to bring in drugs and preparations which have become fashionable since 1934. The emulsions have been drastically overhauled. Emulsio olei morrhuæ and emulsio olei morrhuæ et creosoti are not seriously changed, but in the emulsions of cod-liver oil with glycerophosphates and hypophosphites the cod-liver oil is replaced by vitaminised oil and we must write emuls. ol. vitamin. c̄ glycerophosph. or c̄ hypophosph.: The emulsio paraffini liquidi of the N.W.F. containing 25% liquid paraffin may be dispensed when emuls. paraff. liq. c̄ agar is prescribed. The paraffin content of all the compound emulsions has now been fixed at 25% and agar has disappeared throughout. Potable water is sanctioned in place of distilled except in injections, and for these processes of sterilisation similar to those given in the fourth addendum to the B.P. 1932 have been adopted. There is a new injectio quininæ dihydrochloridi containing gr. 52½ in 4 fl. oz of normal saline (dose 2½–5 fl. drachms intravenously). Linimentum album can no longer be called "egg liniment," for its egg has gone. The new linimentum methylis salicylatis (N.W.F.) has lost its menthol, eucalyptus and camphor and consists simply of methyl salicylate in rape, arachis or cottonseed oil. There are several new liquors, including opii camphoratus concentratus, and Ringer-lactatis as well as those in the N.W.F., and a new lotio benzylis benzoatis. Mistura alba now contains gr. 90 of sodium sulphate to the fl. oz. in place of its gr. 120 of magnesium sulphate. Mistura ammonii acetatis composita has sodium in place of potassium citrate, and dispensers are authorised to substitute sodium for potassium salts elsewhere whenever suitable. The bismuth mixtures remain, but an alternative is provided in mistura magnesii trisilicatis composita. Zipp (zinc oxide, iodoform and liquid paraffin) is now included as well as bipp, and so are the pigmentum iodi and the pigmentum violæ crystallinæ compositum (pig. triplex) of the N.W.F.

THE fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

THE Minister of Labour proposes to apply sec. 66 of the Factories Act, 1937, to toxic anæmia. Draft regulations may be had from H.M. Stat. Office.

MESSRS. JOHNSON & SONS (Hendon) ask us to say that supplies of Estersil are again available.

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GENERAL MEDICAL COUNCIL

(*Continued from p. 709*)

Alleged Falsification of Temperature Charts

The case of *William Blackwood*, registered as of Tregenna, Camborne, M.B. Edin. (1902), who had been summoned on the following charge :—

That being a registered medical practitioner and a medical officer of a maternity ward provided under a scheme of the Cornwall county council at the Camborne-Redruth Miners' and General Hospital, Redruth, (1) You in or about the month of September, 1939, wrongfully agreed with Harry Lee Shimmin, another registered medical practitioner, to commit a breach of the rules made by the county medical officer of health for Cornwall for the management of the said maternity ward and then in force in respect of such ward ; (2) You falsified or caused to be falsified the records of the temperatures of patients in the ward for whom you were responsible, and in particular you falsified or caused to be falsified the records of the temperature of the following patients, namely ; (*a*) Mrs. Edna Carr of The Cott, Porth, Newquay, on certain dates between May 5 and 28, 1941, (*b*) Mrs. Ethel Alice White of 4 Maer Down, Bude, on certain dates between April 7 and 27, 1941 ; and (3) In the cases of Mrs. Edna Carr and Mrs. Ethel Alice White you failed to notify the County Medical Officer of Health as required by the said rules.

Respondent was represented by Mr. A. A. Pereira, instructed by Messrs. Le Brasseur and Oakley, solicitors, on behalf of the London and Counties Medical Protection Society. Mr. G. Howard, instructed by Messrs. Waterhouse and Co., for the General Medical Council, applied that the cases of Drs. Shimmin and Blackwood should be heard together. Mr. Pereira objected that the charges had not been adequately particularised in the matter of the temperature charts. He did not, in fact, know what document his client was alleged to have falsified, and joint hearing might prejudice his case. The Legal Assessor advised the council that the two cases should be heard together, and the members so voted by a show of hands.

The similar charge against *Harry Lee Shimmin*, registered as of Belmont, Redruth, M.R.C.S. (1926), read in similar terms (*mutatis mutandis*), as regards preamble and clause I, and continued :—

(2) You falsified or caused to be falsified the records of the temperatures of patients in the ward for whom you were responsible; (3) In the case of Mrs. Cornish, who was a patient in the said ward on May 26th, 1941, and subsequent days, (*a*) You failed to notify the medical officer of health for the district as required by the Puerperal Pyrexia Regulations, 1939, (*b*) you failed to notify the county medical officer of health as required by the said rules ; (4) You failed to notify the Medical Officer of Health for the district as required by the Puerperal Pyrexia Regulations, 1939, in the case of (*a*) Mrs. Violet Ward, who was a patient in the said ward between Sept. 7 and Oct. 15, 1940, and (*b*) in the case of Mrs. Phyllis Waters, who was a patient in the said ward between Jan. 23 and March 10, 1941.

Mr. Howard cited the relevant regulations, and the rules drawn up by the county medical officer of health, and said the respondents had, within the relevant period, expressed their entire agreement with those rules. Letters between county M.O.H. and respondents showed that their attention had been called to the rules and that they concurred with them in September, 1939. He put in the temperature charts and pointed out that Mrs. Carr's and Mrs. White's charts showed no temperature notifiable under the rules or regulations, but Mrs. Cornish's, Mrs. Ward's and Mrs. Waters's clearly showed circumstances requiring notification. It was claimed that the first two charts had been falsified.

COUNTY M.O.H.'S EVIDENCE

Dr. R. N. Curnow testified that soon after his appointment in March, 1939, he had drawn up rules governing the Redruth Maternity Hospital, and had later consulted Dr. Blackwood, and also the other medical staff ; the rules had been gone through with both respondents, who had accepted them without criticism or objection. In the ward it was the custom for the nurse to take temperatures and enter them in a book. The sister subsequently charted them, and the doctors saw them on their rounds. He produced the original charts and confirmed what Mr. Howard had said about the records then shown. He had received no notification in respect of any of them. Dr. C. H. Rivers, the district medical officer, would have received the certificates and forwarded copies to him. In June, 1941, he had received information from the matron and had held an inquiry concerning Mrs. Cornish who had died. Respondents had been present ; Sisters Davies and Love had made statements in their presence. Sister Davies said she had for some time been falsifying charts with the knowledge of the doctors. Dr. Blackwood had pressed her to say that this had only been done with temperatures under 100° F., she had replied that she could not be sure.

Cross-examined, Dr. Curnow said that on his visits to the hospital he had not noticed the absence of a copy of the rules, and agreed that in his letter to Dr. Blackwood he had used the word " routine," not " rules." The rules had been sent to Dr. Blackwood, who had telephoned that he accepted them and would hang them in the ward. He could not accept the suggestion that Dr. Blackwood had refused to exhibit them. He had never seen the ward routine carried out ; until the inquiry he had not known of the existence of a temperature book in this particular ward, though he knew of it as a very general custom. He had never examined the book. Mrs. Cornish had died on Whit-Sunday and his assistant had at once gone down to conduct an inquiry. He did not remember a telephone conversation with Dr. Blackwood when the latter had expressed astonishment at Sister Love's statement that temperatures were customarily falsified. It was correct that when respondents had arrived at the subsequent inquiry on the Thursday, June 5, conducted by him, they had not known that any accusations were to be made against them. Sister Davies had then said that she had been initiated into the custom of false entry by her predecessor, and that it was a common custom. She had said it was no use checking the charts by the temperature book because that also had been falsified ; she had, in fact, brought the book, but he had never checked the charts by the book, and there was nothing else to check them by. He had complained at the inquiry that the blood-pressure readings were not recorded on the chart ; Dr. Shimmin had at once said that he had taken the readings and called them out to the sister, who had forgotten to enter them. Sister Love had made and signed a statement that charts had been falsified ; he had asked her what the falsification was, and she had said that the first rise of temperature was recorded, but a second was not entered until discussion with the doctors had determined whether or not the case should be notified. He had asked for particulars, but she had been unable to give any. She had not said that the doctors had ever instructed her in any specific case, but she had said that the doctors knew all about the system. She had said that she had repeatedly drawn Dr. Shimmin's attention to Mrs. Cornish's high temperature and asked him to notify and he had taken no notice—but she had added that he was taking every care of the patient. The work of three doctors was at this time being done by two ; all doctors in the area were very heavily overworked at this time. He had made an offer, after the inquiry, to appoint a county obstetrician under whom respondents would perhaps work, if the committee agreed. He had informed the committee that respondents had offered their resignations in writing. He had accused them at the end of the inquiry of trickery, but his letter to Dr. Blackwood, dated June 25, 1941, announcing the committee's agreement to the appointment of an obstetrician, and Dr. Blackwood's reply contained no suggestion of a charge of serious misconduct. He agreed that it would be to the advantage of the doctors to remove difficult cases to the puerperal-fever home. He did not agree that the regulations were unpopular, though they certainly involved extra work and inconvenience. There had been no case of puerperal fever in the ward during the period of Dr. Shimmin's attendance.

In reply to the President, he said he had drawn up the rules because the state of affairs was unsatisfactory ; he had drawn up similar ones in Derby and had submitted those (but not the Cornish ones) to an official of the Ministry of Health. The maternity ward was governed by a voluntary body but administered jointly by them and the county council. He had no statutory powers to enforce his rules. No action in a civil court for infringement of the Puerperal Pyrexia Regulations had been discussed. The clinic to which the patients were to be removed was 10 miles from Redruth ; there was one isolation bedroom in connexion with the ward. The appointments of staff were recommended by the hospital committee subject to the approval of the county council. Dr. Blackwood had been appointed a representative of the county medical officer in administrative charge of

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that ward. He had looked through the temperature books but had found no evidence of alteration; they were written in pencil. Mrs. Cornish's death after cæsarean section had been certified to him as due to toxic thyroid and lobar pneumonia; there had been no autopsy.

* * *

Mr. Pereira said that the death-certificate gave "acute dilatation of the heart; thyrotoxicosis; pneumonia; cæsarean section."

Mr. Howard put in two statutory declarations from Dr. Rivers, district medical officer for Camborne and Redruth, stating that he had never received notifications under the Puerperal Pyrexia Regulations in respect of Mrs. Cornish, Mrs. Ward and Mrs. Waters.

NURSES' EVIDENCE

Miss M. Commerford declared that she was a state-registered nurse and certified midwife and had been employed at the Redruth Hospital from February, 1939, to March, 1940, becoming sister in charge of the maternity ward in September, 1939. She had had no conversation with Dr. Blackwood and Dr. Shimmin except one about temperatures, after a visit from Dr. Curnow. Dr. Blackwood and Dr. Shimmin had told her to notify temperatures to them, and if the patient was fit to be moved they would see about it. Temperatures were not to be charted unless they had seen the patient first. Previously, any rise had been charted as it occurred in the normal way, the record being transferred from the book to the chart by the junior sister the following morning. After that conversation, if there was a rise the doctor was notified and would visit the patient next morning, and the nurses were told that if the patient had a temperature in the evening the doctors would notify the case. The actual temperature was recorded in the temperature book by the staff nurse, sometimes in pencil and sometimes in ink. After the conversation, the entry in the book was not transferred to the chart until the doctor had seen the patient. If then the temperature was down, the previous rise was not charted. She had instructed her nurses accordingly. If the temperature rose the next day above 100·4° F., then the doctors usually transferred the case and the temperatures were put down correctly on the chart. She could only remember one case that would have become certifiable under the Puerperal Pyrexia Regulations had the temperature been correctly recorded. Three or four cases would have become notifiable under Dr. Curnow's rules. In one of Dr. Shimmin's cases she had told the doctor that she would not take the responsibility of not notifying to Dr. Curnow; in this case the chart had been correctly entered. A second false chart had been prepared, when the patient left on the 14th day, under Dr. Shimmin's instructions, to send to County Hall. The old, correct, one she had destroyed, on Dr. Shimmin's instructions. That was the only case she could remember.

Cross-examined, she agreed that matron, assistant matron and sister tutor had been superior to her and that matron had visited every patient daily. Matron had not inspected the temperature charts and books, but they had been available for her inspection. The temperatures were only correctly reported to matron after the doctor had seen the patient, and all patients with temperatures were isolated. If a temperature had been up the previous evening but was normal at the time of matron's round next morning matron would not be told of the evening rise; matron could have observed a blank on the chart, but in witness's experience she had never looked at charts. If the temperature was up for the first time in the morning, matron would not be told of it until the doctor had been consulted. The true temperatures would, however, be in the book where matron could see them if she asked. It was true that in the only case she could remember the true temperature was recorded on the chart, and the falsification only arose when the patient had left hospital and a new, false, chart was prepared for County Hall. Dr. Shimmin had taken some charts for County Hall instructing her to copy them as they were dirty, and told her to make out fresh charts which would indicate that this patient was non-notifiable, whereas the original charts showed notifiable temperatures. She destroyed the originals, although she had refused, as a certified midwife, to take the responsibility of not notifying them and had asked Dr. Shimmin to take them to County Hall. If a high temperature was repeated the patient was sent to Truro, so that in fact the regulations had been completely fulfilled. The patient was always isolated as soon as a temperature rose, if the rise continued overnight (i.e. to 6 A.M.), so that any visitor could see the empty bed, and deduce isolation and temperature, though the chart would not actually show a temperature reading. Matron had left it to sister to notify the doctor of such cases. The conversation with the doctors was soon after war broke out and she was not very clear about it, but she was positive both doctors were there. The subject had been a patient of Dr. Shimmin's who was running a temperature. On the previous day Dr. Curnow had been there and had found a chart and asked why the patient had not been sent to Truro. Dr. Blackwood had not regarded the case as one of puerperal fever. Both doctors had said that no patient should be sent away until they had made investigations. She had been told to contravene Dr. Curnow's rules but not the statutory regulations. Dr. Curnow's rule was that a single temperature of 99·4° F. must involve immediate isolation and removal to Truro.

Re-examined, she said she could not remember any case in which a temperature had been wrongly entered, and the only effect of the doctor's instructions was to postpone the entry on the chart until the doctor had seen the case and made investigations. She had told Sister Davies of the conversation with the doctors. Her instructions had been to falsify the chart if the patient was notifiable under Dr. Curnow's rules but not if notifiable under the regulations.

* * *

Miss Esther Davies, state-registered nurse and certified midwife, said she had been employed at the Redruth Hospital from September, 1939, to June, 1941, succeeding Miss Commerford as sister in charge of the maternity ward. She said that a single rise to 99·4° F. in the evening was not charted unless it had fallen to normal next morning; if it did not fall, the doctor was told and if he did not think it necessary to notify "we just put another temperature down." She could not remember a single case in which she herself had ever falsified an entry. She knew of one case where Sister Commerford had entered a false reading but did not remember the patient's name and thought she had had nothing to do with it. She also had told Sister Love to make false entries in the cases of Mrs. White and Mrs. Carr. She had never had any conversation with the doctors about it, except with Dr. Blackwood about these two cases. She had pointed out the temperatures to him, but could not remember what he said. If the correct temperatures had been charted these cases would have been notifiable to Dr. Curnow under his rules.

Cross-examined, she agreed that her only reason for thinking Dr. Blackwood had decided not to notify these cases was that in fact the patients had not been sent away. She had not seen Sister Love enter an incorrect temperature, or alter the temperature book. The real temperatures had been put in the books at first but she had on her own responsibility ordered that the books be altered to coincide with the charts. There was no evidence at all of what the temperatures had really been. Her recollection was that the temperatures had never been notifiable under the Puerperal Pyrexia Regulations.

* * *

Miss Ena Love, state-registered nurse and certified midwife, said she had been on the staff of the Redruth Hospital as junior ward sister in the maternity ward from September, 1939, to August, 1941. She had taken temperatures and entered them in the book; the charts were never marked until next morning. A wrong entry was made on the chart if a patient twice recorded 99·4° F. and there seemed to be nothing wrong with her; the second reading was not then charted but a lower figure was substituted. She had been so instructed by Sister Davies. She had never had any conversation with the doctors about this matter. She knew that a wrong temperature had been entered in the case of Mrs. Carr. She thought probably about three wrong entries in all had been made. Mrs. Cornish had been Dr. Shimmin's patient and witness had reported to him daily on the condition. She wanted Mrs. Cornish to

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go to Truro and had asked Dr. Shimmin about it several times; he had replied that she was not suffering from puerperal sepsis, her wound was perfectly alright, her lochia were normal, and therefore there was no need for her to go to Truro.

Cross-examined, she said Mrs. Cornish was in a room by herself, but not in special isolation. She had had cæsarean section, was a thyroid case, and developed pneumonia. Her mental condition had not been normal. She herself had made a wrong entry in the case of Mrs. Carr, and possibly also in the case of Mrs. White.

* * *

Mr. Pereira submitted that he had no case to answer, Mr. Howard replied, and after deliberation in camera the President announced that the *facts alleged* against Dr. Blackwood *had not been found proved* to the council's satisfaction and the case against this respondent was therefore ended. The same applied to charges 1 and 2 against Dr. Shimmin, but the council would like to hear the defence to charges 3 and 4: the cases of Mrs. Cornish, Mrs. Ward and Mrs. Waters.

RESPONDENT'S EVIDENCE

Dr. Shimmin testified that Mrs. Cornish came in with obstructed labour and thyrotoxicosis and was very ill and exhausted on admission, with a raised temperature (100·4° F). She had an enlarged thyroid, with pulsating veins in the neck, and was ashen and clammy. Her heart was dilated. She had had two previous forceps deliveries. After a period of expectant treatment, he and Dr. Blackwood had performed cæsarean section. Next morning she seemed fairly well, but the next day there was failure of compensation and mental disorder. The following day (the third day) crepitations appeared at the bases of both lungs. On the fourth day she was a trifle better. On the fifth day there were signs of consolidation in the right base and her heart was dilated. He had seen her three times that day, and at 3 o'clock the following morning she had collapsed and died. The doctors made no case-notes in the hospital; the notes on the chart were made by the nursing staff. He had no private case-record. There had never been any indication of puerperal septicæmia. Sister Love had seemed to him more worried about the patient's temperature than about her condition. She had not asked him to notify it. He thought now that the case should have been notified but at the time he had not regarded it as puerperal septicæmia. He knew also now that the cases of Ward and Waters should have been notified. He had never at any time notified the county M.O.H. on paper; his custom was to telephone. He had failed to telephone about these cases because he forgot; it was an oversight. He had not notified the district medical officer of Mrs. Ward because the patient had pyelitis and not septicæmia. Mrs. Waters was a case of Bartholin's cyst obstructing a vagina full of varicose veins, and adherent placenta with severe hæmorrhage. He had been with her from 1 A.M. to 9 A.M. He had telephoned Dr. Curnow who had advised Truro, and respondent had said she would die in the ambulance. He had thought that his telephone notification to Dr. Curnow would cover the statutory requirement; he now knew that it did not.

Cross-examined, he said he had never seen a copy of Dr. Curnow's rules, but had agreed to follow them. He was aware that the rules and the regulations referred to puerperal pyrexia, not to puerperal septicæmia. Mrs. Cornish had been given M. & B. 693 for the pneumonia. Mrs. Waters had had Prontosil because of the amount of instrumental and manual interference required in her case. Mrs. Ward had had prontosil because it was a ward routine to give it with a rise of temperature. He admitted that his attention had been drawn to the definition of puerperal pyrexia in 1939. He thought he had done his whole duty by telephoning Dr. Curnow and acting on his advice. In reply to members of the council, he said he still did not think Mrs. Cornish's temperature had anything to do with a puerperal condition. He had a fair experience of puerperal septicæmia.

* * *

Mr. Pereira put in two statutory declarations as to character, from Dr. Rivers, district M.O.H., and Dr. T. M. Reed. He addressed the council, which deliberated in camera, after which the President announced that *charges 3 and 4 had been proved* to the satisfaction of the council, which took a grave view of these derelictions of duty and trusted that the proceedings would cause respondent to be more scrupulous in future. He had not directed the registrar to erase his name.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

THE National Service (No. 2) Bill was introduced last week by a three-day discussion of a motion moved by the Prime Minister:

"That in the opinion of this House, for the purpose of securing the maximum national effort in the conduct of the war and in production, the obligation of National Service should be extended to include the resources of woman-power and man-power still available; and that the necessary legislation should be brought in forthwith."

The procedure is unusual. The usual way in which bills are presented is to have a purely formal "first reading" which is just a reading out of the title of the bill without discussion, followed by a "second reading" on which a general discussion takes place. After this comes the "committee" stage, in which detail amendments are made, and eventually a "third reading," which again allows opportunity for a general discussion and sometimes amendment. This three-day debate of the motion was, as the Speaker said in the course of discussions on the form of a proposed amendment, a reversion to an old practice "in the form of a motion" which was a de facto first reading. To the original motion by the Prime Minister an amendment was moved by Mr. George Daggar, and seconded by Mr. William Dobbie, and eventually supported in the lobby by 40 votes of which 33 were Labour, three Liberal, one Independent, and three I.L.P. To these must be added the two Labour "tellers" Mr. Dobbie and Captain John Dugdale, now an education officer with a division and formerly private secretary to Mr. Clement Attlee, Lord Privy Seal.

The amendment proposed that:

"this House, while assenting to the extension of the principle of compulsion to the man-power and woman-power still available, is of opinion that, in order to secure the full utilisation of national resources in the war effort, it is essential that industries vital to the successful prosecution of the war, and especially transport, coal-mining and the manufacture of munitions, should be brought under public ownership and control, and that the necessary legislation should be brought in as soon as possible."

The debate was of a high order but represented a clear-cut cleavage of opinion between those who believe the man-power and woman-power situation can be effectively dealt with without a drastic extension of national control of munitions production, transport, coal and power and those who do not. The vote of 40 for the amendment is not a large proportion of the House, but in view of the strong appeals for "unity" made by Mr. Attlee to the Labour Party members meeting and the strong pressure put on M.P.s to refuse to support the amendment the registering of so many as 40 votes in the lobby in its support indicates a considerable divergence of opinion.

* * *

The debate was not conducted on party lines. Those proposing national ownership and control of certain services did so from the standpoint of war efficiency. Those supporting the amendment were hoping that Mr. Ernest Bevin, who wound up for the Government on the third day, would indicate that property considerations were to be treated as ruthlessly as personal considerations in the carrying out of the new and vast national mobilisation, but they were not satisfied. Mr. Bevin said, in answer to arguments for the amendment, that if it "is seriously advanced that there should be further requisitioning of either property, services or industry . . . the Government will examine any specific claim, and will deal with it on its merits." This statement was felt to be so tepid as to be unacceptable. Mr. E. Shinwell, who had wound up for the Labour Party, quoted a declaration of the Bournemouth Labour Conference of 1940 which authorised

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its members to enter into and support the Government that while planning for war, also planned "for peace and a new society and thus, railways, the coal industry and substantial parts of arms production should be made national services during the war, and the public regulation of finance should be strengthened and consolidated." Mr. Attlee's words in Parliament in May, 1940, when almost absolute powers were taken over "persons and property" were also quoted. Mr. Attlee had said: "The essential thing is that over a wide field—how wide one cannot say at the moment—industry will be carried on for the community in fact, and not for private profit." The case for a speedy unification of transport on national lines with state ownership and control was unanswerable. This applied also to the coal industry. The organisation proposed for the munitions industries was a special regional organisation with boards representing Government, technical and administrative staffs, and representatives of the workers with full power to organise and supervise in their respective districts. Mr. Shinwell ended: "The Prime Minister promised the nation a harder time. That we shall accept with fortitude, but we make this demand: Those hardships must be borne by all alike. Unless this is achieved it will stimulate further criticism and indeed opposition which may prove fatal to the Government's retention of office and, what is of infinitely greater importance, to our prospects of victory."

* * *

There is in this debate no immediate prospect of a complete change of Government, although some changes of individuals may take place. But this active criticism is healthy and useful. National unity does not imply absence of criticism and indeed in every other Parliament in the Dominions overseas there is more criticism because ordinary party government continues. And we shall probably have a good deal more criticism in the second reading of the National Service (No. 2) Bill. And there will be more criticism of the allowances for service dependants—which are to be discussed again—and on health questions, for which a day may be found before Christmas. The medical man-power problem has not yet been solved although investigations by the Shakespeare committee go on. But this committee is a purely ad hoc fact-finding committee, excellent for the purpose, but when that is concluded it should dissolve. To attempt to keep the Shakespeare committee in existence as an executive body to allocate medical man-power or to act as a court of appeal would be unfortunate. There is no reason to superimpose an extra organisation on the present medical one, which, if used, is adequate.

FROM THE PRESS GALLERY

Our Best Foot Foremost

When the Prime Minister moved a resolution in the House of Commons on Dec. 2 that to secure the maximum national war effort the obligation of men and women for national service must be extended he assured members that though the Government proposals would further curtail the amenities of our lives they would not "affect physical health, or the contentment of spirit that comes from serving great causes."

In outlining briefly the bill he said there were three main changes affecting men: block reservation would give way to individual deferment; the age for compulsory military service would be raised to 51 and lowered to 18½. Boys and girls between the ages of 16–18 will register and be interviewed by the youth committees of education authorities who will encourage them to join one of the various youth organisations. Broaching the conscription of women Mr. Churchill hastily said that compulsion to join the services would not be extended to any married women, even those without children. The power to direct them into industry would continue but would be used with discretion. General powers to conscript unmarried women would be sought but would probably only be applied to those in the age-group 20–30, who could choose between the A.T.S., civil defence work, or industry. Those who join the A.T.S. will not be compelled to serve in the lethal or combatant branches.

Mr. JAMES GRIFFITHS pleaded that the Ministry should accept full obligation for those older men, veterans of the last war, who might break down in health after being admitted to the Services.

Mrs. A. HARDIE, a Glasgow Labour member, accepted the principle that women should be drafted into work of national importance, but claimed that war was not a woman's job and she was not suited to barrack life. Mrs. M. TATE, on the other hand, felt that the country was up against such appalling odds that women could not keep out of war, but she regretted the lack of wisdom shown in handling the woman-power problem. Absenteeism in the factories, for instance, was due mainly to the disgraceful inadequacy of the number of nursery schools and day-nurseries in the industrial areas. Mr. ERNEST BEVIN, as the last speaker in the whole debate, took up the cudgels for the Government in doughty fashion. He admitted they were not satisfied with the amenities for the women's auxiliary service, but he was meeting the Service Ministers with a view to improving them, and he mentioned specially privacy and medical attention. The present arrangements by which women doctors served on medical boards when women were examined would be extended so that women doctors might be in attendance to take care of the women called up.

* * *

Just for a handful of silver he left us,
Just for a ribbon to stick in his coat.

In the debate in the Lords on Dec. 3 on the organisation of man- and woman-power, Lord GREVILLE said that for some time hospitals had been fast losing their clerical and domestic staffs, who were attracted by the higher wages offered elsewhere or by a feeling that they wished to get into uniform. He thought the hospitals would be able to retain many of them if they had some sort of uniform to wear. True they had been offered a button, but he did not think a button was a very good substitute. He wondered whether it could be arranged for girls who leave the hospital to join the A.T.S. to return to the hospitals after enlisting if they are willing to continue with that kind of work.

QUESTION TIME

Panel Doctors' Fees

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health whether he was aware that panel practitioners had not received any increase in remuneration during the first two and a quarter years of war; that the proposed increase at the rate of 9*d.* per annum, the first instalment of which, 2¼*d.*, was payable on April 2, 1942, was inadequate to meet the increased expenses of practice, the higher cost of living, and the loss of private patients in receipt of incomes of £225 to £420 per annum; and whether he would make the increase more nearly approximate to the 2*s.* asked for by the medical profession.—Mr. E. BROWN replied: The increase in the capitation fee, which has been agreed with the representatives of the profession, will operate from the beginning of next year. This increase is not intended to compensate doctors for the increase in the cost of living since other classes of persons earning similar incomes do not receive any bonus on this account. I am satisfied, however, that it provides adequately for the other two matters mentioned in the question and I am not prepared to grant any further increase under present conditions.

Reinstatement of Doctors

Mr. T. E. GROVES asked the Minister whether, in view of the recommendation to local authorities and hospitals that British doctors on their staffs might be released and foreign practitioners employed in their stead, he would give an undertaking that after the war the British doctors would be reinstated.—Mr. BROWN replied: The position of the British doctors referred to is safeguarded by the fact that the Defence Regulation under which practitioners with foreign qualifications are registered in the Medical Register will cease to operate when the Emergency Powers (Defence) Act, 1939, expires after the war.

Alleged Incorrect Certificates

Captain CHARLES TAYLOR asked the Minister of Labour to what extent he had evidence that members of the medical profession had provided incorrect medical certificates to men of military age, stating that they were unfit for military service; and whether there had been any cases of the men concerned admitting that these certificates were untrue and obtained for large sums of money.—Mr. ERNEST BEVIN replied: The police authorities investigated a number of cases last year but the evidence was not sufficient for a prosecution.

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Further cases are at present under investigation.—Captain TAYLOR: Have particulars of these cases been reported to the General Medical Council?—Mr. BEVIN: No, I think they have been investigated by the police.—Sir HENRY MORRIS-JONES: In the interests of the medical profession itself will the Minister adopt ruthless measures in the case of anyone found guilty of this type of allegation?—Mr. BEVIN: I certainly will, but I have to get evidence before I can bring a prosecution. Doctors are very fortunate; they can bury their mistakes (laughter).—Captain TAYLOR: Surely, if there have been eight or nine cases in respect of a particular doctor, that is sufficient evidence for a prosecution.—Mr. R. DE LA BERE: The thing is a scandal and needs cleaning up.—Captain TAYLOR gave notice that in view of the unsatisfactory nature of the reply he would raise the matter again at an early date.

Birth Registration and Ration Books

Mr. A. C. BOSSOM asked the Minister of Health if he would see that the registration of newborn babies might be effected, in cases where the father was away on service and the mother could not attend, due to serious illness, by a responsible person equipped with the necessary medical certificates, making the application so that the essential ration-book might be obtained.—Mr. BROWN replied: While birth registration is governed by statutory conditions which cannot and ought not to be disregarded, we recognise that unavoidable delay in birth registration must not be allowed to prejudice the mother and child in regard to essential food-rationing facilities. The Minister of Food and I are in touch about the matter.

Maternal Mortality in Scotland

Mrs. A. HARDIE asked the Secretary of State for Scotland if any steps were being taken to provide more hospital accommodation for maternity cases, in view of the increase in maternal mortality in Scotland.—Mr. T. JOHNSTON replied: In the past two years nearly 500 new maternity hospital beds have been made available. Nearly 100 further beds will shortly be provided in buildings at present in course of erection. I am advised, however, that shortage of beds is not a significant factor in the increase in maternal mortality.

Infant Death-rate in Scotland

Mr. T. KENNEDY asked the Minister if his attention had been drawn to the dangerously high stillbirth and neonatal death-rate in Scotland; and if, in view of the fact that this high mortality and falling birth-rate indicated need of an all-round improvement in medical, nursing and the general economic conditions of expectant mothers and growing children, including a widespread extension of communal dinners, he could indicate the prospect of legislation to deal with the problem.—Mr. JOHNSTON replied: Stillbirths are not increasing, but a slight rise in neonatal deaths has occurred in 1941. It is too early to say whether the rise is temporary or not, but everything possible is being done by the Ministry of Food and the health authorities, central and local, to ensure that the nutritional needs of expectant mothers are met.

School Meals in Scotland

Thirty-one education authorities in Scotland supply solid meals in school, and the remaining four light meals, to children who are not necessitous. (Mr. JOHNSTON in reply to Mrs. HARDIE.)

Physical Standard for Ex-miners

In answer to a question Mr. BEVIN said: The physical standard laid down for ex-miners returning to the pits for underground work is that examiners should be satisfied that a man's general physique is such as to enable him to undertake work at or near the coal face; examiners are asked to give special attention to cases where valvular disease of the heart may be suspected. Men are to be rejected if found to be suffering from tuberculous disease or uncontrollable hernia. I have no information as to the number of men who are on an average passed as physically fit per hour. Doctors are paid a fee of 5*s.* for each man examined.

Industrial Rehabilitation

The provisions of the interim industrial rehabilitation scheme extend to persons who are prevented by industrial disease, or tuberculosis, from following their normal occupation and who are suitable for training and employment in the occupations covered by the scheme. (Mr. BEVIN replying to Mr. F. MESSER.)

Workers from Ireland

Mr. W. W. WAKEFIELD asked the Minister of Health if a medical examination was made of workers coming across from Ireland to ensure that they were not suffering from any disease.—Mr. BROWN replied: I understand from the Minister of Labour that there is no regular system of medical examination for workers coming to Great Britain from Eire or Northern Ireland, but that some are medically examined in their home areas at the instance of the employers engaging them. I would refer to my reply on Nov. 20.—Mr. WAKEFIELD: Is the Minister aware that some workmen coming from Ireland may have tuberculosis, venereal disease and other diseases, and will he take steps to see that a proper examination is made at the port of entry in order to prevent these diseases from spreading in this country?—Mr. BROWN: Perhaps you will look at my answer (*Lancet*, Nov. 29, p. 681).—Sir PERCY HURD: Is anything further being done following on that answer?—Mr. BROWN: The authorities have power to take certain action in regard to these diseases.—Sir JOSEPH NALL: Does the Minister realise that the matter is one of urgency and ought to be dealt with firmly?—Mr. BROWN: It is not merely a matter of these particular persons. Preventive measures have to be applied in other directions too.

SOCIAL SECURITY IN NEW ZEALAND

The N.Z. Government's second attempt to bring in a universal G.P. service which began on Nov. 1 is a fee-for-service plan, the capitation system of February, 1941, having failed to take on. My last note (see *Lancet*, Nov. 15, p. 615), writes a correspondent, described the medical and public outcry which resulted in the fee for a G.P. service being raised from 5*s.* to 7*s.* 6*d.* with 12*s.* 6*d.* for an urgent or Sunday call. Patients are allowed to make their own private arrangements if they wish, and a doctor may charge 10*s.* 6*d.* or more. Legally, however, he can sue for no more than 7*s.* 6*d.*, and this provision led the B.M.A. to refrain from sending representatives to the committee of control, until this "ancient British right of access to court" be restored. The B.M.A. disapproves of the scheme but has agreed to work it, at the same time calling for a non-political commission of inquiry into the whole field. The Government allow two methods of collecting the 7*s.* 6*d.*:

(1) The patient signs a form to the effect that the service has been rendered. The doctor sends in a heap of forms once or twice a month and is paid by the department.

(2) The doctor bills his patient 10*s.* 6*d.* or whatever he chooses, and the patient's receipt is a valid claim at a post office for 7*s.* 6*d.* for each service.

The B.M.A., fearing that in the future the 7*s.* 6*d.* might be cut down to 5*s.* or 2*s.* 6*d.*, decided that its members should use method (2); the patient and not the doctor would then be the loser. Accordingly from Nov. 1 practice will be carried on as usual, patients being assisted by the department in granting a 7*s.* 6*d.* rebate for each service. A number of doctors, however, prefer method (1) on account of its simplicity and economy (of stamps, paper, postage, time, &c., especially in war time), and because many patients will regard the 7*s.* 6*d.* as a fair fee and will refuse to pay more. No-one knows whether a specialist can charge 7*s.* 6*d.* for a poor patient, a follow-up examination after operation, or a cancer case. These and many other points remain to be cleared up. The scheme is expected to cost the Government £2,000,000 a year, which is a lot of money—especially if no great benefit to the people accrues.

JOINT TUBERCULOSIS COUNCIL.—Twenty members were present at a meeting of the council held at the London School of Hygiene on Nov. 22 when Dr. D. A. Powell (Wales) welcomed Dr. J. Ferguson (Surrey) representing the Society of M.O.H's and Dr. G. B. Dixon (Birmingham) the National Association for the Prevention of Tuberculosis. Dr. Powell was nominated chairman for 1942, Dr. James Watt (Godalming) and Dr. Edward Ward (Devon) vice-chairmen, Dr. G. Jessel (Lancs) treasurer, and Dr. J. B. McDougall (Preston Hall) secretary. For the care and rehabilitation committee Dr. McDougall and Dr. F. R. G. Heaf stated that part 1 of the report dealing with rehabilitation would be published forthwith and part 2 on care committees early in the New Year. Dr. McDougall pointed out that the Ministry of Labour "interim scheme" could not apply to persons suffering from tuberculosis unless there was the closest coöperation between tuberculosis physicians and the ministry's visitor to the hospitals concerned. Admission to the training centres of patients with open disease might have grave consequences.

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Letters to the Editor

STILLBIRTH AND NEONATAL MORTALITY

SIR,—As Professor Baird and Dr. Wyper recognise, the numbers of cases analysed in their paper (*Lancet*, Nov. 29, p. 657) are small and must be accepted with reserve, but their findings are substantiated by a statistical study, shortly to be published, which I have recently completed, and this covers an analysis of the trend in social mortality since 1911 by age, occupation of father, cause of death, regional incidence, and other factors. I find that although the difference between the highest and lowest economic groups has narrowed somewhat since 1911 for neonatal mortality (the excess having fallen to 66%), the difference at ages 1–3, 3–6 and 6–12 months has increased. Despite, therefore, the fall in the absolute death-rates, the excess shown by the lowest class over the top class at ages 6–12 months, for instance, rose from 299% in 1911 to 498% in 1930–32.

Baird and Wyper find that the neonatal mortality-rate for booked cases is 27·4 per 1000 (1938-40). This may be compared with the rates for Croydon (17 in 1938), large Dutch communes (17·7 in 1930–32), Oslo and Amsterdam (16 in 1936), doctors in England and Wales (20·5 in 1930–32), and class I England and Wales (21·7 in 1930–32); while even infants of bricklayers' labourers in England and Wales had achieved a rate (26·3) lower than that reported eight years later by Baird and Wyper for booked hospital experience. Moreover the neonatal death-rates for children born to civil servants, doctors, dentists, teachers and other analogous economic groups were lower thirty years ago than the corresponding rate for Aberdeen Hospital found by Baird and Wyper. These and many other facts go far, I suggest, to confirm their general conclusions on the need for immediate measures to be taken by the appropriate authorities.

Chiswick, W.4. RICHARD M. TITMUSS.

PERFUMED HYPOCHLORITE SOLUTIONS FOR SPRAYING

SIR,—Some people object to the odour of the mist of sodium hypochlorite used in the disinfection of the air of air-raid shelters and other crowded or poorly ventilated spaces. This objection can be overcome, however, by treating the hypochlorite before spraying with a small quantity of a pleasant smelling substance. The choice of such a substance, together with any solvents that may be necessary to disperse it in the hypochlorite solution, is limited by the following conditions. (1) It must be resistant to the chemical action of sodium hypochlorite; (2) it must not impair the bactericidal action of the mist; and (3) it must not be toxic in the concentration necessary to provide an effective masking odour. It has been found that the two mixtures mentioned below fulfil these conditions.

	A	B
β naphthyl methyl ether (Neroli) ..	1 g.	..
Trinitro tertiary-butyl xylene (synthetic musk)	..	1 g.
Cetyl alcohol	1·5 g.	1·5 g.
Carbon tetrachloride	10 c.cm.	10 c.cm.
Sulphonated castor oil	15 c.cm.	15 c.cm.
Water to	100 c.cm.	100 c.cm.

If 1 c.cm. of either A or B is added to 100 c.cm. of 1% sodium hypochlorite a mist is produced on spraying in which the odour of hypochlorite is not discernible. The dispersion of the scent in hypochlorite is relatively stable in the physical sense but may, if the solution is left still for several hours, tend to flocculate. Complete redispersion can be achieved by slight agitation. The chemical stability of the dispersion has been tested by leaving an excess of mixtures A and B in contact with 1% sodium hypochlorite solution for a week. No appreciable reduction of the available chlorine in the solution occurred. Similarly the bactericidal action of the perfumed hypochlorite was tested by spraying it in a sealed room into which a mist of *Streptococcus salivarius* in broth had previously been introduced; it was found that there had been no sensible diminution in the killing power of the hypochlorite.

Finally, in regard to the toxicity of the components of the two mixtures chosen. It should be noted that at the concentration of hypochlorite often recommended for use as an aerial disinfectant—i.e., to give 1 volume of hypochlorous acid in 2×10^6 volumes of air—the corresponding concentration of either scent is in the order of 1 volume in 5×10^8 volumes of air, at which concentration very few of even the most poisonous substances have any action when breathed over long periods. Similarly with the solvents and dispersing agents used, cetyl alcohol and sulphonated castor oil are almost non-poisonous in themselves, and carbon tetrachloride quite harmless in the very small concentration used. In point of fact, Davis in the *J. Amer. med. Ass.* 1934, **103**, 961, suggests that it is safe to work for long periods in a concentration of 1 part of carbon tetrachloride in 10^4 parts of air; the quantity which will be sprayed from the scented hypochlorite is 1 part in 3×10^7 which is less than a threethousandth of this safe maximum.

J. E. LOVELOCK,
National Institute for Medical Research. O. M. LIDWELL.

PERINÆAL SUTURE UNDER LOCAL ANÆSTHESIA

SIR,—I am indebted to Prof. F. J. Browne for pointing out that he has been using for many years the technique I described (*J. Obstet. Gynæc.* 1941, **48**, 610) for suturing the perinæum under local anæsthesia. I was not, of course, claiming any originality for the method, and I must apologise to Professor Browne for omitting reference to his article on the subject. War conditions made an exhaustive search of the literature difficult. I was aware that the method was in use in one or two hospitals but I did not know of any specific instances. My aim in writing the article was to make the method more generally popular, for the serious disadvantages and dangers of giving a general anæsthetic to a woman exhausted by the strain of labour are not sufficiently realised. Professor Browne's testimony to the value of the method will, I hope, help to popularise it. The cases I described were the first on which the method was used as a routine at Charing Cross Hospital. Since then, I believe, it has been regularly adopted.

Hendon. DENYS J. NEAL SMITH.

CHRONIC MENINGOCOCCAL SEPTICÆMIA

SIR,—The following case seen in general practice seems similar to those described by Major Dickson and others in the *Lancet* of Nov. 22.

A lady in middle life had been in good health up to about six months before the present illness. During this period she had become more easily tired and disinclined to do her normal duties. In the evening of Oct. 17, 1941, she had a definite rigor. She sweated profusely during that night and spent the next day in bed. On the 19th red spots appeared on the lower parts of her legs, round the ankles and on her wrists and forearms. The spots were neither painful nor itchy, and she said that if she had not seen them she would not have been aware of their presence. On the 20th she dressed and went downstairs, feeling "very seedy." I was called to see her on the 22nd. She was then in bed. Her chief complaint was a feeling of extreme weakness and a tendency to faint when she got out of bed. She then drew my attention to the spots on her legs and arms. She looked pale, her temperature was 99° F. and pulse-rate 72. The tongue was clean and moist, and the throat slightly reddened. There were no enlarged glands and I found no abnormality in the heart, lungs, C.N.S. or abdomen. There was a crop of round pink spots on the dorsum of both feet, on the lower third of the front of both legs, on the backs of the hands, and on the forearms. There were a few isolated spots on the flanks and one in the right scapular area. The spots resembled those of erythema nodosum but with three major differences—they were all of uniform size and shape, and each spot was about the size of a split pea; some of the older lesions had a minute hæmorrhagic centre; and they were neither itchy nor painful. The patient told me that a few fresh spots appeared each day. They were appreciably raised above the skin surface; on pressure they were slightly tender but did not disappear. Over the lower third of the right tibia there was an area of subcutaneous swelling. This pitted on pressure and was tender, but there was no discoloration of the overlying skin, except in the areas where the spots were situated. There were no joint pains, the patient did not complain of headache, and Kernig's sign was absent. During the following days fresh crops of spots appeared, all on the lower parts of the

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legs and forearms, but a few on each flank. The Wassermann and Widal tests were negative and a blood-count was normal. There was no history of tuberculosis in any near relative. The temperature remained normal from Oct. 23.

The resemblance of the skin lesions to those described by Stott and Copeman[1] led me to start treatment with sulphapyridine. Four 0·5 g. tablets of M. & B. 693 were given at once, followed by three after three hours and thereafter two every four hours until 23 tablets were taken, representing 11·5 g. of sulphapyridine. The result was dramatic. After 24 hours the spots were fading and no fresh crops appeared. The spots disappeared uniformly and the most recent were arrested in their development, though after 48 hours their nodular character could still be felt. The area over the lower third of the right tibia was now considerably less tender and swollen. Six days after the beginning of treatment the skin lesions had all almost disappeared. The patient vomited only once during the whole course of treatment. After the sulphapyridine was stopped her appetite improved rapidly with her general condition. At this stage she slept for unusually long periods each day and this tendency lasted for about a week. Her progress since then has been continuous and uneventful.

This seems to be a case of chronic meningococcal septicæmia without any evidence of involvement of the meninges.

Finchley. J. GRIMSON.

CONVALESCENT HOMES FOR CIVIL DEFENCE WORKERS

SIR,—May I draw the attention of your readers to facilities that are open to civil-defence workers through the Civil Defence Workers' Rest Department of the Joint War Organisation? Accommodation is available, in three Joint War Organisation convalescent homes near London which have been temporarily allocated for this purpose, to civil-defence workers of both sexes in the Metropolitan area and Outer Ring who are in need of change after illness or injury, or of rest and recuperation as a result of a long spell of duty, &c. There is no charge to applicants, who may apply on their own account or through their A.R.P. authority, in which case the applicant is asked to attend the weekly Red Cross medical inspection, bringing a certificate from their own doctor and a leave permit from their A.R.P. authority. Civil-defence workers who have been hospital patients (either in- or out-patients) may proceed direct on application by the lady almoner to the Civil Defence Workers' Rest Department. In addition to full-time civil-defence workers, the facilities are at present also open to part-time A.R.P. personnel, registered fire-watchers injured on duty, and those who have been discharged from the service but who contracted their illness or injury while in the service. Free transport from central London is provided. Accommodation is also available in the Bristol area for local personnel, and it is hoped shortly to extend to other parts of the country. Applications and requests for further information should be made to the secretary, Convalescent Section, 6, Cadogan Square, S.W.1 (Slo. 9951).

HORDER,
Chairman, Civil Defence Workers' Rest Dept., J.W.O.

TREATMENT OF THE MENOPAUSE

SIR,—Here comes that bogy-man again! This time in the guise of your own distinguished and authoritative self. One tends to accept opinions uttered in your annotations as coming from eminent authorities on their subject and to take special note of any warnings thus expressed. Coming from such a source a commentary on the treatment of the menopause cannot be lightly disregarded. What do we find, then, are the views expressed in your annotation of Dec. 6 (p. 705)? A warning against the use of stilbœstrol—"other œstrogens" are mentioned only in the last sentence—in the alleviation of menopausal symptoms: the only crime that stilbœstrol—as compared with the other œstrogens apparently—has committed is to be "cheap and simple to take" and to yield in many cases dramatic results. In sounding this warning you quote only one reference (*Amer. J. Obstet. Gynec.* 1940, **40**, 980), a paper by a psychiatrist whose evidence is based on the use of stilbœstrol which he describes as "a new synthetic ovarian follicular hormone not yet available for general use," in 26 cases of psychosis, including involutional melancholia, schizophrenia and Korsakoff's syndrome, occurring in the menopausal era or subsequent to it. This is the first time I have heard of œstrogens as a cure for secret drinking in elderly women. None of the patients complained of hot flushes. In spite of the fact that "the amounts of the synthetic hormone prescribed were considerably in excess of any as yet reported in the literature" the psychiatric clinical course during treatment showed no improvement in 67% and "4% became much worse." You will note that 4% of 26 patients is roughly 1 patient. However, as is not altogether surprising in view of the somewhat alarming size of the dose which must have been given—the original author does not bother to mention the exact doses—certain symptoms and effects did appear. Here you assume too faithfully the rôle of reporter at the expense of your critical functions, and mention "other toxic side effects such as enlargement and fullness of the breasts, areolar pigmentation, increased sexual feelings, nausea, diarrhœa and even dysmenorrhœa." These effects are said by the author to be due to stimulation of ovarian and genital activity by stilbœstrol. It is certainly interesting to hear a psychiatrist describe increased sexual feelings as a toxic side effect! Œstrogens, of course, far from stimulating ovarian activity actually depress it.

But not content with these warnings your annotation resurrects two favourite old bogies and introduces a new one which I find fascinating and intriguing. Here they are. "No actual evidence is clinically available that this substance is in man a carcinogen, yet no-one would sponsor its exhibition in a case of established breast or uterine cancer." This matter has been fully discussed in many places, including your own columns (e.g., *Lancet*, 1936, **2**, 1365). Cramer and Gye showed that prolonged administration of œstrogen in high doses was capable of causing mammary cancer in susceptible strains of mice, but pointed out that the period of administration necessary to produce such carcinoma in mice would correspond in terms of the human life cycle to 7–10 years. There is even less evidence of the induction of malignant tumours of the uterus in experimental animals. Secondly, your annotation mentions the occurrence of pituitary tumours in small animals after the administration of œstrogens. Nothing of the kind has so far been reported in human beings, though œstrogens have now been used extensively for 10 years. Finally, it makes the fascinating suggestion that "some patients seem to acquire almost a drug addiction to stilbœstrol" and are difficult to wean from its subtle attraction. I know of no evidence to suggest that stilbœstrol or any other œstrogen induces a drug addiction, though I have seen patients whose menopausal symptoms are relieved by œstrogens loath to discontinue what they conceive to be an efficacious form of therapy.

Your annotation is entitled Treatment of the Menopause. Treatment of the menopause with œstrogens consists in the administration of small doses in interrupted courses controlled when possible by vaginal smears and hot-flush counts, and not in giving maximal doses to psychotic patients of menopausal or post-menopausal age showing none of the recognised signs attributable to ovarian deficiency. By the prudent use of œstrogens I can assure you that you will avoid what you describe as "toxic side effects" and may with an easy conscience abandon your rôle of bogy-man.

Endocrine Clinic, Guy's Hospital. P. M. F. BISHOP.

STETHOSCOPES OLD AND NEW

SIR,—I should like to add a few remarks to the annotation in your issue of Nov. 15. While the usual types of stethoscope rely on an air-space to act as sound-box, there are some in which the sound is transmitted without intermediate amplification directly by means of a solid conductor of wood, ebonite or other plastic. This type of stethoscope consists of a solid rod, one end of which is funnel-shaped and has a roughened surface to prevent it slipping on the skin, while the other end fits tightly into an ear-piece similar to that of other stethoscopes. The loss of amplification in this type is usually well compensated by the truth of transmission and the complete absence of extraneous sounds. Moreover, the ordinary chest-piece must be applied firmly and the

1. *Lancet*, 1940, **1**, 1116.

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pressure exerted influences the quality of the transmission, whereas the solid conductor type relies on point contact only and can be applied in almost any way. Thus it has great advantages for teaching because the distortions and extraneous sounds arising from inexperienced use of the other types are completely absent and the beginner can easily distinguish the true heart-sounds. The close approach to the patient which the use of this instrument necessitates may, however, be inconvenient for the examiner.

London, W.1. J. PLESCH.

A CONTRAST

SIR,—The *Times* on Dec. 5 reported that the Duke of Kent visiting the Nursing Recruitment Centre spoke of the "fine career" now offered by nursing, and added that he could speak "with personal knowledge of the excellent conditions in the hospitals today."

The *Royal Cornwall Gazette* on Nov. 4 reported an inquest held on a baby who had died in a public-assistance hospital. The autopsy had shown death to be due to suffocation through the child inhaling its own vomit. The coroner's comments included these words: "I have called you together because you may feel it your duty to comment on the member of the staff at the hospital. There are about 80 patients at present and we shall hear that neither of the two young nurses on night duty is qualified nor trained." In her evidence the nurse involved stated that she had to start washing patients at 3.30 A.M., make the beds of 33 patients, give the inmates their first morning feed, and assist with the breakfast. She added that she had to visit ten separate wards, five on the bottom floor and five on the top floor. It was stated that of the nursing staff of eight only the sister-in-charge was trained.

Can one blame parents who hold back their daughters from the "fine career" of nursing if they are liable to be confronted with conditions such as the above during their so-called "training"?

Northwood. ESTHER CARLING.

LUPUS ERYTHEMATOSUS AND TUBERCULIN TESTS

SIR,—Some points in Dr. Kelvin's article of Nov. 15 require further elucidation. He found that 71% of 148 cases of lupus erythematosus gave a positive tuberculin reaction as compared with 18% of 240 adult controls. This latter figure is extraordinarily low when compared with other mass tuberculin surveys. In 1929 D'Arcy Hart, on testing 751 clinically non-tuberculous controls of all ages, found that in the adult age-group 88% were positive to 1 in 1000 tuberculin. Admittedly these figures relate to the highly industrialised district of London and probably a slightly lower figure would be obtained if this survey were repeated now. It would be of interest to know from what section of the populace Dr. Kelvin's controls were derived, whether urban or rural, and how this very low figure of 18% can be accounted for when compared with the findings of other observers. It is also stated in the article that a tuberculous history was commoner among the cases of lupus erythematosus than among the controls. This statement would be more convincing if the actual figures relating to this were given. I am not qualified to express any opinion as to the ætiology of lupus erythematosus but I feel that some explanation of the points I have raised is necessary before the author's conclusions can be accepted.

Colindale Hospital, N.W. W. E. SNELL.

SIR,—I am prepared to believe that in Dr. Kelvin's area the tuberculous cases of lupus erythematosus are commoner than in the south of England. This was a point I emphasised in a recent paper. But how does he account for the numerous published cases of the acute generalised form of the disease which ended fatally and in which either no trace of tuberculosis or no active focus was found post mortem (e.g., Roxburgh, A. C. *Brit. J. Derm.* 1933, **45**, 95)? In such cases there must be a flooding of the blood-stream with toxin. Most of them, of course, die of streptococcal septicæmia (all of Roxburgh's five cases). Forman and I in 1933 published a paper (*Ibid*, p. 4) on intradermal tests in lupus erythematosus and allied conditions and our results were very different.

London, W.1. H. W. BARBER.

Obituary

THOMAS HENRY WILSON

M.A. DUBL., F.R.C.P.I.

Dr. T. Henry Wilson, a former president of the Royal College of Physicians of Ireland and King's professor of midwifery in the school of physic, Trinity College, died on Nov. 20 at the age of seventy-six. Wilson was the elder son of the late Captain John Wilson of XIV Regiment, and was educated at Foyle College, Londonderry, and at Shrewsbury. He qualified in 1887, and spent some time as a ship surgeon. When he came home he turned to midwifery and was assistant master at the Rotunda Hospital for three years during Sir William Smyly's mastership. Later he was appointed gynæcologist to the Richmond Hospital and to Sir Patrick Dun's Hospital, and in 1898 he became F.R.C.P.I. and in 1926 was elected president. He had been appointed to his chair in 1911 and he held this post till 1936 when ill health forced him to retire. His widow, elder daughter of the late Colonel W. Lyster Smythe, survives him.

Wilson was a retiring man, who took little part in professional affairs. As a teacher he was painstaking and courteous, and his skill as a surgeon won for him a good gynæcological practice. He was a charming companion, and his friends found him kindly, humorous and tolerant.

ALGERNON E. L. WEAR

C.M.G., M.D. DURH., D.P.H.

Colonel Wear, who died last week at Harrogate in his 76th year, was born in Newcastle-on-Tyne and educated at the local grammar school. After qualifying at Durham University in 1891 he held many residential posts in Leeds before settling there in general practice. He became a part-time school medical officer and in 1910 his full-time appointment gave scope to remarkable organising abilities. He had a great influence on his staff, whom he inspired with his own conception of school medicine, and the open-air school owes much to his wisdom and foresight. His greatest fight was over cleanliness in which he achieved striking results. Like many busy people he had many outside interests. He joined the old volunteer corps before it became the R.A.M.C., for some time acting as adjutant. When the Territorial Army was organised in 1908, Wear became the first commanding officer of the 1st West Riding field ambulance, which he raised to a high state of efficiency until he was put in command of the divisional casualty clearing station which he later took out to France as the 7th C.C.S., remaining with it until he came home to take up an important command at Alnwick. For his services he was made C.M.G. and later became president of the Leeds branch of the "Old Contemptibles." He was largely responsible for the foundation of the Poor Children's Holiday Camp (with a record of summer holidays for 24,000 children) and was one of the pioneers of the orthopædic hospital at Kirby Moorside. Two well-known Leeds institutions, the "Boots for Bairns" fund and "Children's Day," owed much to his efforts. An engineer before he started medicine, Wear was a great model locomotive builder and had a magnificent model railway at one time. He was a loyal freemason, and a past master of his lodge who never sought higher honours. He married Emily, eldest daughter of the Rev. F. Peel, vicar of Heslington, York, and leaves her with two sons and two daughters.

WILLIAM FORDYCE

M.D. EDIN., F.R.C.P.E., F.R.C.O.G.

Dr. William Fordyce, who died at Tillicoultry, Clackmannan, on Nov. 6, at the age of 78, was the last of that group of brilliant obstetricians—Simpson, Croom, Barbour, Hart, Murray, Haultain, Ferguson, and Lackie—who added to the renown of the Edinburgh school of medicine.

Though he was born at Liverpool, Fordyce counted himself a Fifer, for his parents came from the Kingdom and he himself was educated at Anstruther and later at St. Andrews, where he read for an arts degree. He studied medicine at Edinburgh, graduating with first-class honours in 1888, and five years later, after post-graduate study at Leipzig and Berlin, he took his M.D.

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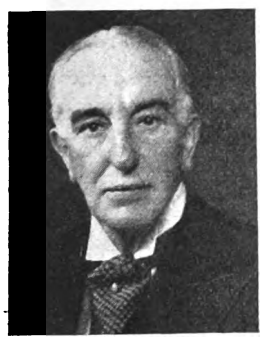
Once he had decided to specialise in obstetrics he was invited by Sir Alexander Simpson, who was a close personal friend, to become his assistant at the university and later he was appointed a lecturer in the extramural school. He also held staff appointments at the Royal Maternity and Simpson Memorial Hospital, the Royal Infirmary, Leith Hospital and the Hospital for Women in Archibald Place, and soon he was recognised as one of the leading obstetricians and gynæcologists of Edinburgh. He retired from the heavy demands of his private practice some ten years ago.

Dr. Fordyce served as president of the Edinburgh Obstetrical Society in 1919. Already in 1898 he had been elected to the fellowship of the Royal College of Physicians of Edinburgh, and in 1929 he became a foundation fellow of the new college of obstetricians. Apart from these professional contacts he was a member of the Pen and Pencil Club, the Scottish Arts Club, and, as Father Profundus, of the Monks of St. Giles. C. K. writes: Fordyce was a vivid and colourful teacher, a brilliant diagnostician and a skilful operator. He was a man of many gifts and tastes—an average golfer, a good curler, and an excellent angler. He was also a witty versifier and a popular after-dinner speaker, and his songs and recitations told in his own inimitable way will live in the memory.

GODFREY DE BEC TURTLE

M.D. DURH., M.R.C.P.

Dr. de Bec Turtle died on Dec. 4 after a brief illness at the Luton and Dunstable Hospital which he had gone to superintend. He will be much missed in and around Cambridge Square where he had been for some forty years the trusted family physician, retaining to the last the signs-manual of silk hat and stock. He rose early and was a constant figure in the Row before breakfast with his friend Sir William Willcox; he could often be found at the Olympia horse show, where he had been known to compete on one of his own excellent horses. Always interested in everything around him, sympathetic and helpful to a degree, he had a sound business head with which he served many professional occasions. The Harveian Society came first, then the Royal Society of Medicine whose financial position brightened during his years of office, and when his experience had ripened he was invited to preside at the council of the Medical Defence Union, and four days before his death was elected chairman of the Medical Sickness Assurance Society. And he was never happier than when he was giving a dinner party with his wife and family to medical men from home or abroad.



Lafayette

Born at Woodford, Essex, in 1877, the son of Dr. Frederick Turtle, Godfrey de Bec Turtle was educated at Haileybury, King's College, London, and Durham University, where he graduated with honours in 1902. Two years later he took his M.D. and in 1908 became M.R.C.P. While obtaining these higher qualifications he was strenuously preparing himself for his future work—later many colleagues were glad to come to him for counsel, especially in midwifery cases—and after holding resident appointments at King's he spent three years as R.M.O. at the Public Dispensary, Drury Lane. He never severed his connexion with this hospital and when he died was its senior physician. He also found time to undertake clinical assistantships at the Evelina Hospital, the Royal Eye Hospital and the Children's Hospital at Paddington Green, but he gave up this work when in 1911 he was appointed physician to the Margaret Street Hospital for Consumption. Dr. Turtle married Florence Cawood, daughter of Mr. H. H. Baker; they had two daughters, and one son, Dr. Peter Turtle, now serving as a surgeon commander.

Major ARTHUR BRODIE HAMILTON BRIDGES, O.B.E., who died at Cheltenham on Oct. 22 at the age of 55 after an operation, took his conjoint qualification from St. Thomas's Hospital in 1912 and received his commission in the R.A.M.C. from the special reserve a year later. During the last war he served in Gallipoli, Macedonia and Egypt, and later in India he was appointed surgeon to the Commander in Chief. After the war he served as surgeon captain to the Life Guards but returned to the R.A.M.C. in 1923 and was promoted major two years later. He retired in 1933, but took up a retired pay appointment at the central recruiting depot in 1938.

Medical News

University of Cambridge

On Dec. 6 the following degrees were conferred by proxy:—

M.D.—T. D. Day.

M.B., B.Chir.—R. E. M. Pilcher and R. E. W. B. Comerford.

University of Manchester

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B., CH.B.

J. G. Atherton, J. K. Brown, J. H. Hilditch, S. H. Jackson, Heskel Khazam, N. A. Lewtas, N. S. Marsden, Ann L. Pinson, G. J. Shanklin and H. G. B. Slack.

University of Wales

At recent examinations for the degrees of M.B., Ch.B. the following were successful:—

Pathology and Bacteriology.—E. R. Edmunds, Phœbe J. M. Griffiths, Tegwyn Jones, H. D. Walters and Al. A. Yauniskis.

Surgery.—Beryl Bevan, W. M. Jones and Monica Parry-Morton.

National University of Ireland

The degree of M.D., has been conferred on Patrick FitzGerald and Dermot Roden.

University of Dublin

At recent examinations at the school of physic, Trinity College, the following were successful:—

M.D.

W. M. E. Anderson, R. S. W. Baker and M. C. Wood.

FINAL EXAMINATION FOR M.B., B.CH. AND B.A.O.

Medicine.—L. H. Shrago, J. R. Hassard and Dorothy H. Webster (*second-class honours*); Ethna M. MacCarthy, L. H. Citron, C. E. Williams, Florella Starritt, J. A. Pearce, J. B. Dunlop, Kathleen M. J. Morphy, J. N. Greene, Muriel Eakins, Basil Marcus, A. R. B. Jackson, E. S. Odbert, M. B. Flanagan, R. O. D. Reid, T. L. Kelly, A. C. McReynolds, Margaret F. Y. Dixon and Catherine E. Craig.

Surgery.—Emmeline P. Crowe, N. J. Anderson, L. H. Shrago, Dorothy W. M. Last, J. P. Walsh, A. J. B. MacFarland, Al. C. McReynolds, L. H. Citron, Jack Morris, and J. A. Pearce.

Midwifery.—J. F. Dignan and Brenda R. Boydell (*first-class honours*); I. M. Ali, K. J. Swanepoel, A. M. Jacobson, Cecilia J. Dippenaar, S. B. Stein and Rena Becker (*second-class honours*); Franziska G. Brill, J. W. Dignan, D. M. Brooks, V. O. Stewart, Lavinia F. Nightingale, Bernard Novis, R. C. Rylance, P. J. Mentz, J. W. van der M. Roos and I. E. P. Cope.

D.P.H.: *Part II.*—Leila Finegan.

Faculty of Radiologists

The following were successful at the examination for the fellowship of the faculty:—

Radiodiagnosis.—Eric Samuel, M.D. Lond., F.R.C.S., D.M.R.E.

Radiotherapy.—Alice M. Ross, M.B. Edin., F.R.C.S.E., D.M.R.E.

Royal Society of Medicine

The section of comparative medicine of this society will continue their discussion on the control of diseases of cattle inimical to man on Wednesday, Dec. 17, at 2.15 P.M., when Prof. Thomas Dalling, M.R.C.V.S., and Dr. S. Roodhouse Gloyne will speak on tuberculosis. On Dec. 18 at 2.30 P.M. at the section of neurology Prof. Geoffrey Jefferson, Prof. Hugh Cairns, Dr. W. Russell Brain and Dr. Ludwig Guttman will open a discussion on rehabilitation after injuries to the central nervous system.

Strickland Goodall Lecture

The third Strickland Goodall lecture will be delivered at the Apothecaries Hall in June, 1942, by Dr. William Evans, assistant physician to the cardiac department of the London Hospital. His subject will be triple rhythm.

Prevention of Accidents

The second training course for industrial accident prevention organisers to be held in this country has now been arranged by the Royal Society for the Prevention of Accidents on behalf of the factory department of the Ministry of Labour. It will be held at Balliol College, Oxford, from Jan. 2 to 13, and about 50 trainees, nominated by their employers, can be accommodated. The programme may be obtained from the secretary of the society, 52, Grosvenor Gardens, London, S.W.1.

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Notes, Comments and Abstracts

BADGE OF OFFICE

SWEEPING and garnishing never had their due while our world still clung to the Victorian belief that you came down to breakfast at eight o'clock and found the rooms clean and tidy, the fire burning and the coffee made; and that it was all done by magic. Most of us have given up that airy notion in private life, but in hospitals the domestic work still has to be done, and done early; and there is not much magic about it. We have already noted (*Lancet*, Nov. 22, p. 655) that the Ministry of Health, with genuine appreciation of the contribution which hospital domestic workers are making towards winning this war, have decided to provide badges for them. More insight has been shown in making the gesture than in choosing the design of the badge (shown in the illustration). The words "Ministry of Health" appear in silver letters on a red enamelled border, and "Hospital Service" is in blue on a silvered cross-bar. The effect though honest is dispiriting. Might not one of our penniless artists have been given the opportunity to do a national service and design a badge worthy of the ministerial inspiration?

Badges will be issued to all those workers on the domestic side in hospitals, including manual and supervisory staff, who are giving not less than 96 hours service a month, and it is estimated that 60,000 people will be eligible, most of them women. Many hospitals are short of domestic workers, and the Ministry of Labour has agreed that women giving full-time service in this capacity will not be asked to transfer to other war work; moreover women who are not in essential employment can, if they wish, ask to take up this work when they register. No doubt the recognition of the value of the work which the badge implies will carry some weight with registrants.

FELIX INFELIX

". . . limited quantities of damaged dried milk no longer suitable for human food can be issued to owners of warehouses and other food stores in which cats are kept to destroy vermin . . ." (Hansard).

Milkless, my cat? Observe the regulations:
You cannot hope to share the infant's meed.
In time of war the milk becomes the nation's,
And who are you to swig the nation's need?
Yes, who indeed are you? Cry out upon us!
A personage of note, not all unsung.
The harmless necessary cat, your honours—
The milkless mouser with a parching tongue.
Harmless and necessary? What, no greater?
Doyen of symmetry, address, aplomb!
The saucer, yawning like an empty crater,
Shows where the Minister has dropped his bomb.
Someone, I think, remarked you had your uses;
Major Lloyd George unblushingly replied:
"The modicum of milk reserved for pussies
Is damaged, dated, damned, disdained and dried."

FLASHBACK

A Diary of World Affairs by Marcel Hoden (Penguin Books. 6*d*.) which covers the period from June, 1940, to April, 1941, is a useful reminder of the sequence of events during a tumultuous year which to most people was too confusing to be seen in perspective. As a collection of facts as to who said and did what—and when—it is concise and readable. Whether the author's optimistic interpretation of these events is as reliable only time will tell. For a Frenchman disappointed in his own country's behaviour he seems a little too enthusiastic in his eulogy of ours. Perhaps he ought to give up expecting too much of human nature, or disappointment may become his lasting portion.

BURROUGHS WELLCOME AND CO. inform us that, subject to priority demands, Tabloid sulphaguanidine 0·5 g. is now available to the medical profession.

Infectious Disease in England and Wales

WEEK ENDED NOV. 29

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1415; whooping-cough, 1959; diphtheria, 1047; paratyphoid, 16; typhoid, 7; measles (excluding rubella), 850; pneumonia (primary or influenzal), 1101; puerperal pyrexia, 124; cerebrospinal fever, 140; poliomyelitis, 15; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 197; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 26 was 1319, including scarlet fever, 168; diphtheria, 287; measles, 36; whooping-cough, 481; enteritis, 32; chicken-pox, 36; erysipelas, 32; mumps, 9; poliomyelitis, 4; dysentery, 13; cerebrospinal fever, 11; puerperal sepsis, 18; enteric fevers, 17; malaria, 1; other diseases (non-infectious), 71; not yet diagnosed, 103.

Deaths.—In 126 great towns there were no deaths from measles, 1 (0) from enteric fevers, 1 (0) from scarlet fever, 12 (2) from whooping-cough, 31 (3) from diphtheria, 41 (1) from diarrhœa and enteritis under 2 years, and 37 (4) from influenza. The figures in parentheses are those for London itself.

Bristol reported 1 death from an enteric fever. Middlesbrough and Swansea each had 4 fatal cases of diphtheria.

The number of stillbirths notified during the week was 167 (corresponding to a rate of 32 per thousand total births), including 16 in London.

Births, Marriages and Deaths

BIRTHS

BELCHER.—On Dec. 3, at St. Andrews, the wife of Flying-Officer J. Rashleigh Belcher, M.B.—a daughter.

TAYLOR.—On Dec. 6, at Crickhowell, Breconshire, the wife of Dr. A. Brian Taylor, of Birmingham—a daughter.

WARBURTON.—On Dec. 1, at Oxford, the wife of Dr. E. J. Warburton, of Wallingford, Berks—a son.

WILSON.—On Dec. 2, at Summercourt, Cornwall, the wife Dr. C. M. Wilson—a daughter.

MARRIAGES

ARMIN—CONWAY.—On Nov. 29, at Streatham, Richard Hayward Armin, M.B., flying-officer, R.A.F.V.R., to Margaret Mary Joynt Conway.

GOLDSTEIN—BROWNING.—On Dec. 6, at Nottingham, Jacob Goldstein, M.B., to Madge Browning.

TIBBITS—WHARTON.—On Nov. 29, at Bournville, Stephen Tibbits, M.R.C.S., of Warwick, to Joan Mary Wharton.

WARD—SAUNDERS.—On Dec. 2, in London, Philip Macready Ward, M.B., to Margery Kathleen Saunders.

DEATHS

COOKSON.—On Dec. 1, at the Staffordshire General Infirmary, Frederick Nesfield Cookson, M.D. Lond., F.R.C.S., aged 70.

MCCAUGHEY.—On Dec. 7, at Liverpool, Francis George McCaughey, B.A. R.U.I., L.R.C.P.I.

MOSSE.—On Dec. 6, in Minneapolis, Francis Henry Mosse, M.A.Oxfd, M.R.C.P., S.P.G. medical missionary in China.

OWENS.—On Dec. 6, John Switzer Owens, M.D. Dubl., A.M.I.C.E., M.I.Mech.E., F.R.S.I.

SPARKES.—On Dec. 5, at Scarborough, William Moore Bell Sparkes, D.S.O., M.R.C.S., lieut.-colonel, R.A.M.C., retd.

TURTLE.—On Dec. 4, Godfrey de Bec Turtle, M.D. Durh., M.R.C.P.

Appointments

PIERRE, J. H., M.B. Lond., F.R.C.S.: M.O. (grade B) at Trinidad.

Birmingham Accident Hospital and Rehabilitation Centre.—The following appointments are announced:—

BADGER, F. G., F.R.C.S.E.: deputy clinical director;
HOWAT, T. W., L.R.C.S.E., first assistant; and
WOLFSON, L. J., M.B. Lond., D.A.; resident anæsthetist.

A BIRTHDAY PRESENT.—Under the terms of Mr. Bernhard Baron's will a grant is made every year on his birthday to hospitals and charities. This year over £43,000 was distributed, of which £16,000 went to London hospitals and £10,000 to hospitals outside London.

MEDICAL HONOUR.—The D.S.C. has been awarded to Temp. Surgeon Lieutenant Benjamin Crawshaw, L.R.C.P.E., for bravery and devotion to duty when H.M.S. *Grimsby* was lost.

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ORIGINAL ARTICLES

PFEIFFER'S BACILLUS (INFLUENZAL) MENINGITIS

N. MUTCH, M.D. CAMB., F.R.C.P.
SENIOR PHYSICIAN TO GUY'S HOSPITAL; SECTOR ADVISER IN MEDICINE, E.M.S.

THE discovery of the virus of epidemic influenza diverted medical attention from an earlier preoccupation with *Hæmophilus influenzæ* of Pfeiffer. Disappointment had long been felt that the strain of this bacillus isolated from the respiratory passages rarely displayed much invasive power when inoculated into animals. It is remarkable therefore that meningeal infections caused by Pfeiffer's bacillus should prove so uniformly fatal and completely resistant to all therapeutic measures which have been tried. A number of examples of the condition have been noted in this country during the past year and the time is opportune for a review of our knowledge of the subject.

Most of the observations on the disease have been made in America, where it seems to be more common than in Britain. Slawyk [29] described the earliest case in which the diagnosis was established bacteriologically. Neal,[18] analysing 3139 cases, found that it was the fifth commonest American variety and accounted for 4·5% of all cases of meningitis. Fothergill,[6] recording 51 cases at the Children's Hospital, Boston, over a 4-year period during which there had not been any outbreak of epidemic cerebrospinal meningitis, found that it was the commonest type of all and represented 23·1% of the meningitis group. In this country it is comparatively uncommon, but since August, 1941, 3 undoubted cases and 2 other possible ones have been admitted to a Kentish Hospital of about 1000 beds. We may owe our comparative immunity to a higher individual resistance to Pfeiffer's bacillus acquired in this land of the common cold—an idea which receives support from the bacteriological findings in the cerebrospinal fluid. In American reports [2] the bacilli are described as occurring in strikingly great numbers. In the cases reported here the bacilli have been so few that they might easily have escaped notice. Possibly the disease is sometimes overlooked when laboratory facilities are inadequate. The bacteriologist often fails to see or grow any organism from cerebrospinal fluid submitted to him from patients with suppurative meningitis. There is a tendency to ascribe such failures to death of the bacteria during transport of the specimen or to the administration of sulphonamides before collection of the fluid; but it is conceivable that this unsatisfactory group may include a proportion of influenzal cases.

CASE-HISTORIES

CASE 1.—A soldier, aged 30, complained for 2 weeks of headache, giddiness and periodic weakness and sensation of swelling in his legs. Ambulatory, and given sick leave. Admitted on return with definite head retraction and occasional vomiting; normal cerebration. Temperature 101·6° F., pulse-rate 104, respirations 24 per min. C.S.F.: pressure 250 mm.; slightly opalescent; protein 0·09%; cells 46 per c.mm. (chiefly mononuclear); gram-negative bacilli seen resembling *H. influenzæ*; cultures sterile. Blood-serum agglutinated *H. influenzæ* from case 5 at dilution 1 : 40. Two normal controls agglutinated same organism at 1 : 20. White-cell count 13,300 with 70% of polymorphs. Treated with Sulphonamide E.O.S. (80 g. in 7 days). Temperature became normal in 24 hours. Head retraction disappeared in 36 hours. Recovery rapid, uninterrupted and complete.

Note.—Bacteriological diagnosis in this case not fully established. Prognosis far better at 30 than during infancy.

CASE 2.—A youth of 16. Acutely ill for 48 hours with headache, fever and vomiting. On admission semicomatose, with head retraction and positive Kernig's sign. Temperature 102·6° F., pulse-rate 108, respirations 26 per min. C.S.F.: pressure 280 mm.; turbid; protein 0·28%; cells 7,840 per c.mm. (polymorphs 98%); extracellular gram-negative bacilli seen resembling *H. influenzæ* but cultures sterile. Blood-count: white cells 14,900 with polymorphs. 79%. Treated with sulphonamide E.O.S. (80 g. in 7 days). Temperature normal in 48 hours. Recovery rapid, uninterrupted and complete.

Note.—Bacteriological diagnosis not fully established. Prognosis far better at 16 than during infancy.

CASE 3.—Infant, aged 17 months. Acute onset with fever and irritability. On admission, 36 hours later, quiet, considerable head retraction and positive Kernig's sign. Temperature 102·2° F., pulse-rate 116, respirations 44 per min. C.S.F.: pressure 90 mm. (rose later to 330 mm.); opalescent (thick pus later); protein 0·16% (rose later to 0·45%); cells 84 per c.mm. (990 per c.mm. later and visible clots of pus), polymorphs 92%; gram-negative bacilli seen in small numbers in six specimens and pure growth of *H. influenzæ* obtained from each. Treated by lumbar puncture and cisternal puncture and with sulphapyridine (34·5 g. in 14 days, and after an interval of a week a second course of 32 g. in 15 days). Partial defervescence during each course of sulphapyridine but general condition unaffected. Stertorous and unconscious by 36th day; death. Report on autopsy by Dr. S. J. Hopkins: Brain congested with flattening of the convolutions. Thick yellow pus over base, extending forwards and surrounding optic nerves. Lateral ventricles distended with thick yellow pus which extended throughout the ventricular system.

CASE 4.—Girl, aged 6 years. Acute onset with headache and vomiting 24 hours before admission. Semicomatose when first seen with moderate neck rigidity, Kernig's sign and opisthotonus. Restless with well-marked photophobia and meningitic cry. Temperature 102·4° F., pulse-rate 110, respirations 26 per min. C.S.F.: pressure 200 mm.; turbid; protein 0·24%; cells 4560 per c.mm. (polymorphs 97%); occasional extracellular gram-negative bacilli seen; pure growth of *H. influenzæ* on culture. Treated with sulphonamide E.O.S. (12·5 g. in 2 days). Day after admission respiration became deep and rapid. Blood-stained frothy sputum; Cheyne-Stokes respiration. Death after 62 hours of illness.

CASE 5.—Infant, aged 7 months. Onset with coryza 12 days before admission. Odd behaviour on 8th day of illness and right-sided twitching on 10th day. Not comatose until a few hours before death, but had tense fontanelle, muscular twitchings and head retraction. Temperature 100° F., pulse-rate 140, respirations 36 per min. C.S.F.: pressure 210 mm.; turbid; protein 0·1%; cells 1480 per c.mm. (polymorphs 92%); very occasional extracellular gram-negative bacilli seen on four occasions and pure growth of *H. influenzæ* obtained from each of six specimens. Treated with sulphapyridine (18 g. in 8 days), lumbar puncture, cisternal puncture, intrathecal and intravenous serum from case 1 and from normals. The fluid obtained by lumbar puncture on the 25th day of illness was almost pure pus but that obtained by cisternal puncture was only slightly opalescent. A day later at autopsy thick pus was found on the surface of the brain. Loculation, typical of this disease, was pronounced.

Report on autopsy by Dr. S. J. de Navasquez: Dura mater adherent to arachnoid by very thick greenish purulent exudate so abundant over cortex that in many areas over vertex superficial pattern could not be seen. On being stripped, dura retained some of exudate on its under surface. Cerebral convolutions flattened and sulci obliterated; large subarachnoid collections of pus in island of Reil, basal cisterns and around medulla and throughout the spinal theca. Ventricles filled with similar exudate. Brain substance very soft but devoid of intracerebral suppuration. Left lung showed some consolidation of lower lobe; remainder of lungs normal. Myocardium pale and soft from fatty change. Histology: brain showed a severe purulent meningitis, which in places had penetrated beyond the arachnoid, which could not be seen; pia intact in the sections examined. No intracerebral lesions. Gram-negative bacilli present in exudate, which on culture gave a pure growth of *H. influenzæ*. Lower lobe of left lung showed atelectasis and some hæmorrhage, but no inflammatory changes. Liver and myocardium showed fatty change only.

BACTERIOLOGY

As seen in the cerebrospinal fluid, the organisms are gram-negative and usually extremely pleomorphic. Although small bacilli are the predominant form, larger

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bacilli, coccoid, diplococcoid and long filamentous forms are commonly seen. They cannot be cultured on ascitic or trypagar media but grow well on chocolate agar. Meningococci, pneumococci and hæmolytic streptococci also multiply freely on this medium, a circumstance which greatly simplifies the routine investigation of material. Several types of *H. influenzæ* have been differentiated, the two principal categories, according to Pittman,[22] being: (*a*) rough forms, a heterogeneous group of feeble pathogenicity (strains isolated from the respiratory passages are usually of this kind); (*b*) smooth forms developing capsules, a homogeneous group strongly pathogenic and characteristic of strains isolated from the cerebrospinal fluid. Fothergill and Chandler [8] by repeated subculture of meningeal strains were able in time to dissociate from them a number of avirulent variants which grew in rough colonies, were serologically heterogeneous, and closely resembled the innocuous type which frequents only the respiratory passages. Rivers and Kohn [26] demonstrated the homogeneity of the meningeal types by agglutination reactions. Pittman [22] confirmed the fact by precipitin tests. Wright and Ward [32] showed further that the rough forms were easily killed by bactericidal substances present in the blood, but that the meningeal smooth forms were far more resistant and therefore more fitted to invade the tissues. It can thus be taken as a firmly established fact that the meningeal strains of *H. influenzæ* isolated in America are with few exceptions smooth strains and mostly belong to one serological type—Pittman's group b. It is desirable that strains isolated in this country should be collected by one central laboratory and examined culturally and serologically.

AGE AND RESISTANCE

Infants and young children are particularly prone to meningeal infections. The age-incidence graph of every common variety shows a peak at some point between the ages of 6 months and 2 years. Influenzal meningitis conforms to this general rule. Of Neal's 3139 cases, 65% were in patients under 2 years. Rivers,[25] reviewing 193 cases, found that 79% of the patients were under that age. For Bloom's [4] 49 cases the figure was 62% and for Fothergill and Wright's [11] 76 cases it was 75%. It is almost unknown during the first 2 months of life and is commonest between the ages of 6 and 9 months. The incidence gradually falls off to reach a very low figure by 3½ years. Occasional cases are found among older children and adults. Fothergill and Wright found that the blood of normal adults possesses strong bactericidal powers against *H. influenzæ*. Blood from the umbilical cord at birth exhibited similar characteristics, but during the latter half of the first year of infancy the bactericidal power of the blood is lost. They were able to demonstrate a close reciprocal relationship in each age-group between the incidence of influenzal meningitis and the bactericidal potency of the blood of the population in general. The freedom of the adult from this infection was thus closely correlated with the development of an acquired immunity, and the lower fatality-rate among older children and adults was explained.

CLINICAL FEATURES

The meningeal infection is of a frankly suppurative type and gives rise to symptoms closely simulating those of other forms of suppurative meningitis. A common cold or other infection of the upper respiratory passages often precedes the meningeal symptoms.[27 11] The respiratory infection is not usually severe nor does it resemble infections with the influenzal virus; furthermore, meningitis due to Pfeiffer's bacillus is no more common during influenzal epidemics than at other times.[14] Dowds [5] has reported 2 cases in which the antecedent lesions were subcutaneous abscesses due to the Pfeiffer organism, but such cases must be very rare, and the usual portal of entry for the organism appears to be the mucosa of the respiratory tract. Fever, drowsiness, irritability, vomiting and neck rigidity develop rapidly as in cerebrospinal fever, but at times the onset may be as insidious as that of tubercular meningitis. Bacteræmia is a conspicuous feature [6] and blood-cultures may yield *H. influenzæ* persistently throughout the course of the disease. The prognosis is extremely grave and infants rarely recover. The patient may die during the first few days of illness (case 4) or death may be postponed for several weeks (case 3). In the latter event loculation of pus in the meninges usually occurs and it becomes impossible to relieve the symptoms of excessive intracranial pressure either by lumbar or cisternal puncture. Fluid withdrawn from below may then present characteristics widely divergent from those of fluid obtained from above. In spite of every effort to drain the subarachnoid space the pressure of the pent-up pus in various closed pockets may so compress the brain that all signs of the original convolutions are lost (case 5). Even in these circumstances, and with a thick stiff cream of almost inspissated pus lying over the surface of the brain, the patient may not lose consciousness entirely until the last. The outstanding feature of the disease is the inflammation of the meninges without any particular involvement of the brain.

Cerebrospinal fluid.—As withdrawn from the lumbar region, the cerebrospinal fluid may be opaque and turbid or merely opalescent. Leucocytes are abundant, the count varying from a few hundreds to several thousands per c.mm.; mononuclear cells are also found and may be as numerous as 200 per c.mm. Stained smears of the deposit show gram-negative bacilli and evidence of phagocytosis. Chlorides are low and protein and globulin are increased, the protein commonly ranging between 0·1% and 0·4%. The pressure may rise to values above 300 mm. of saline, but with the onset of loculation it tends to fall again to normal figures in spite of the high tension of pus imprisoned deeply in the skull.

DIAGNOSIS AND TREATMENT

Clinically the disease cannot be distinguished from other forms of suppurative meningitis. Diagnosis can only be established by bacteriological examination of the cerebrospinal fluid. In a certain proportion of cases the supernatant cerebrospinal fluid exhibits a precipitin reaction when mixed with the corresponding immune serum [6] but the usual diagnostic procedure is inspection of the gram-stained smear and incubation of the deposit inoculated on chocolate agar. Confirmatory culture is essential because other varieties of gram-negative bacilli sometimes cause meningitis—for example the salmonellas. The salmonella organism may occur in such pleomorphic forms in the cerebrospinal fluid as to mimic *H. influenzæ* [16] in stained smears of deposit. Bahrenburg and Ecker [3] collected 35 cases from the literature and many other cases have been reported in more recent years. Amongst the strains identified are *Salmonella schottmülleri* (*Bacterium paratyphosum B*), *S. enteritidis*, *S. paratyphi* (*Bact. paratyphosum A*), *S. panama*. The clinical features of salmonella meningitis resemble those of influenzal meningitis but a history of diarrhœa may replace that of respiratory catarrh. In each case the meningitis is of purulent type and polymorphonuclear leucocytes are numerous in the cerebrospinal fluid. The fatality-rate is very high in each disease, being 80 to 100% for influenzal meningitis and 91% in Bahrenburg and Ecker's collected salmonella cases. It will presently be shown that influenzal meningitis is resistant to sulphonamide therapy, but there are indications that salmonella infections can be controlled with these drugs.[16]

In so lethal a disease as influenzal meningitis the fatality affords a convenient inverse measure of the therapeutic success. At ages under 2 years the fatality is much greater than among older children and adults. Full consideration must be given to this fact in all attempts at comparative analysis. Among 78 cases admitted to the Boston Children's Hospital over a period of 12 years, Fothergill and Sweet [9] found only one case of spontaneous recovery. The following data are available:

—	Total cases	Fatality %		
		Mixed cases	Children under 2 yr.	Adults and children over 2 yr.
Rivers [25]	220	92	97	..
Bloom [4]	320	..	96·7	..
Neal, Jackson and Appelbaum [20] ..	111	100	100	..
Wilkes-Weiss and Huntington [30] ..	500	..	97·6	79·5
Fothergill and Sweet [9]	78	..	99	..

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The presence of toxic substances in the filtrates of *H. influenzæ* cultures was first noted by Parker,[21] who prepared a corresponding immune serum. Utilising this product Wollstein[31] was able to protect the rhesus monkey from the effects of Pfeiffer cultures injected 24 hours earlier. Kolmer[17] noted that cerebrospinal fluid from patients with influenzal meningitis is devoid of complement, a fact which has been verified by Fothergill[7] and Ward.[10] Normal cerebrospinal fluid also is free from complement, but complement has frequently been detected in specimens from meningococcal and pneumococcal cases. Pittman[23] therefore gave intrathecal injections of human complement as a therapeutic measure but without success. Fothergill and Ward[10] prepared horse antiserum with strong bactericidal powers and high agglutinin titre. They showed that the bactericidal effect of complement + antiserum is far greater than that of white blood corpuscles + antiserum and concluded that the natural curative mechanism is one of complemental bacteriolysis. They treated 5 cases with a mixture of complement (normal human serum) and bactericidal horse serum injected by lumbar puncture, cisternal puncture, through the anterior fontanelle and into the lateral ventricles through trephine openings, but every patient died. Post-mortem examination revealed the usual loculation of pus in abscess-like cavities walled off from the general subarachnoid system. Rittenberg[24] was able to record a successful case two years later and in 1937 Fothergill[6] published a substantial series of 201 cases with a modified mortality of 84·6%. He had relinquished his heroic modes of injection and relied on simple lumbar puncture with occasional use of the cisternal route. This method has now been employed by many workers,[7 27 28] and the opinion is widely expressed[1] that Fothergill's serum and complement have no appreciable effect on the general course of the disease. Moreover the issue is not affected materially when guineapig complement[27] is used instead of human serum. The latest development of this type of therapy also comes from America. Goodner and his colleagues[12 13] showed that antipneumococcal serum from the rabbit is more effective than that from the horse and believed the difference to be due to the greater penetrating power of the smaller molecule of the rabbit immune bodies. Alexander[2] therefore prepared an anti-influenzal rabbit serum which is now in use clinically. Good results are reported to have followed its use[6] but a final assessment of its utility still remains to be made.

Sulphanilamide, sulphonamido-chrysoidin and sulphapyridine have each been used without definite success.[1 5 27] Aleman[1] has given an analysis of 82 cases treated with sulphanilamide and 18 treated with sulphapyridine. He also quotes substantial groups of patients treated with various combinations of these drugs and Fothergill's serum. On the whole the fatality-rates are a little lower than those recorded before the introduction of these drugs. But when the uncertainty of statistical deductions made from small numbers of cases is taken into account, and the inclusion of older children and adults in the series is noted, it is clear that proof of any benefit accruing from these drugs is still lacking. It can be stated dogmatically that in this disease the sulphonamides have not shown that unequivocal power of control which they exert over the corresponding meningococcal infections.

The problem of reducing the appalling mortality of influenzal meningitis has not yet been solved in spite of much endeavour. I would suggest that less effort be made to inject remedial agents directly into the subarachnoid space. The disease is essentially a septicæmia and a meningitis, not an encephalitis or a primary infection of the cerebrospinal fluid. The fluid itself is a poor culture medium, but the organism survives vigorously for 24 hours or longer after the patient's death in contact with the tissues. The meninges are well supplied with blood-vessels and curative bodies can most appropriately be introduced by that route.

SUMMARY

Pfeiffer's bacillus meningitis is well known in this country though it is less common than in America.

The responsible strains are capsulated gram-negative bacilli forming a single homogeneous serological group. Strains isolated from the upper respiratory passages are relatively avirulent members of the Pfeiffer group and are serologically heterogenous.

The disease is essentially one of infancy and does not often affect adults.

Specific bactericidal substances are present in the blood of members of the immune age-groups but their titre in children between the ages of 6 months and 2 years is low.

The clinical features are those of acute suppurative meningitis. Loculated collections of pus often form. Bacteræmia is common and persistent. The diagnosis cannot be established without bacteriological examination. Cultures (for example, on chocolate agar) must be made to differentiate the condition from those due to other gram-negative bacilli, such as *Strep. meningitidis*.

The prognosis is extremely grave and infants rarely recover. Serological treatment has not yet met with any definite success and the sulphonamides have not perceptibly affected the fatality among infants. The adult fatality-rate is far lower than that of infants; recovery-rates must therefore be correlated closely with age-grouping if the curative effects of sera and chemotherapeutic substances are to be assessed. Therapeutic assay could readily be made by studying the disease in infants of 2 years or under, and excluding adults and older children from the series.

REFERENCES

1. Aleman, R. (1940) *Med. surg. J.* **93**, 25.
2. Alexander, H. E. (1939) *Proc. Soc. exp. Biol. Med., N.Y.* **40**, 313.
3. Bahrenburgh, J. H. and Ecker, E. E. (1937) *J. infect. Dis.* **60**, 81.
4. Bloom, C. J. (1931) *Med. surg. J.* **83**, 455.
5. Dowds, J. H. (1940) *Lancet*, **2**, 100.
6. Fothergill, L. D. (1937) *New Engl. J. Med.* **216**, 587.
7. — (1935) *J. Pediat.* **6**, 374.
8. — Chandler, C. A. (1936) *J. Immunol.* **31**, 401.
9. — Sweet, L. K. (1933) *J. Pediat.* **2**, 696.
10. — Ward, H. K. (1932) *Amer. J. Dis. Child.* **43**, 873.
11. — Wright, J. (1933) *J. Immunol.* **24**, 273.
12. Goodner, K., Horsfall, F. L. and Dubos, R. J. (1937) *Ibid*, **33**, 279.
13. — — and MacLeod, C. M. (1938) *N.Y. St. J. Med.* **38**, 245.
14. Hayes, W. (1940) *Brit. med. J.* **1**, 500.
15. *Int. med. Dig.* (1941) **38**, 191.
16. Katsampes, C. P. and Bradford, M. D. (1940) *J. Pediat.* **16**, 79.
17. Kolmer, J. A. (1924) *Proc. Ass. Res. Nerv. Ment. Dis.* **4**, 71.
18. Neal, J. B. (1935) *J. Amer. med. Ass.* **105**, 568.
19. — (1938) *Ibid*, **111**, 1353.
20. — Jackson, H. W. and Appelbaum, E. (1934) *Ibid*, **102**, 513.
21. Parker, J. T. (1910) *Ibid*, **72**, 476.
22. Pittman, M. (1931) *J. exp. Med.* **53**, 471.
23. — (1933) *Ibid*, **58**, 683.
24. Rittenberg, B. B. (1934) *J. Amer. med. Ass.* **102**, 1674.
25. Rivers, T. M. (1922) *Amer. J. Dis. Child.* **24**, 102.
26. — Kohn, L. A. (1921) *J. exp. Med.* **34**, 477.
27. Silverthorne, N. and Brown, A. (1940) *J. Pediat.* **16**, 456.
28. — Fraser, D. T. and Snelling, C. E. (1937) *Ibid*, **10**, 228.
29. Slawyk, D. (1899). Quoted by Aleman, R. (1940) *Med. surg. J.* **93**, 25.
30. Wilkes-Weiss, D. and Huntington, R. (1936) *J. Pediat.* **9**, 462.
31. Wollstein, M. (1911) *J. exp. Med.* **14**, 73.

PFEIFFER'S BACILLUS MENINGITIS

RECOVERY WITH CHEMOTHERAPY

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A male infant, aged 1 year, was admitted to the County Hospital, Pembury, with a history of 24 hours' profuse vomiting, rigidity of the body, a fixed stare and drowsiness. He had been well till the onset of this illness, and there was nothing relevant in the history. He was extremely ill. Temperature 104° F., pulse-rate 150, respirations 60. He was pale, irritable and slightly dehydrated; there was some neck rigidity, but Kernig's sign was negative. Except for a few purpuric spots on the loins there was nothing else abnormal. Lumbar puncture showed turbid cerebrospinal fluid under slight pressure (not measured); protein 0·2%; 1600 polymorphs and 100 lymphocytes per c.cm.; chlorides 725 mg. per 100 c.cm.; no sugar. Direct smears showed small numbers of gram-negative bacilli of hæmophilus type. Culture gave a pure growth of *Hæmophilus influenzæ*.

Sulphapyridine (M. & B. 693) was given by mouth in the following doses: 1st day, 3½ g.; 2nd day, 3 g.; 3rd day, 3 g.; 4th day, 2½ g.; 5th day, 2 g.; 6th day, 2 g.; 7th day, 1 g. Total 17 g. The temperature fell to normal at the end of 24 hours and did not rise again. Although the child was much improved, he remained irritable for 3 days, and at the end of

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4 days all symptoms and signs had disappeared. He was discharged fit on the 9th day after admission.

Although this case recovered with the administration of sulphapyridine, no claim is made that the recovery was due to chemotherapy—it may or may not have been fortuitous. But it is worth noting that the child had only one lumbar puncture. This is a procedure I have followed in all cases of meningitis since chemotherapy has proved so effective. In children, any therapeutic value the lumbar puncture may have had has now almost disappeared. Its usefulness is solely diagnostic. By watching the temperature and pulse charts, the clinical condition and the diminution of vomiting, restlessness and signs of meningeal irritation, the progress of any case can be easily assessed. Lumbar puncture need only be repeated in the rare cases where progress is unsatisfactory.

I am grateful to Dr. A. W. Taylor who did the pathological investigation.

PHOTOELECTRIC METHOD OF ESTIMATING HÆMOGLOBIN

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THE hæmoglobin content of blood can be accurately estimated by a photoelectric method. In the method to be described the absorption of green light by the pigment is determined by means of a vacuum photocell in conjunction with a Lindemann Electrometer, obtained from the Cambridge Instrument Company. The light source was a 12-volt 36-watt motor-car head lamp, supplied by six 2-volt 60-ampere-hour accumulators. This gave a light free from the erratic variations seen when a light supplied from the mains was used. The filament of the lamp was focused on the plate of the photocell by means of a lens (fig. 1). The current through the photocell caused by the incident light is determined by measuring the potential drop across a fixed resistance of 200 megohms, connected in series with a potential of 120 volts. The potential drop is measured by the Lindemann electrometer (fig. 2).

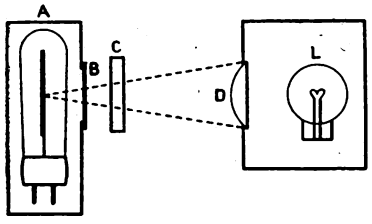

FIG. 1—Light passes from the lamp (L) through the condensing lens (D), the fluid cell (C) and a colour filter (B) to the photocell (A). L and A are enclosed in light-proof boxes.

The *photocell* is a General Electric Company's K.M.V.6 potassium-silver oxide type, which has a sensitivity to all parts of the visible spectrum, but not to the infra-red range. The linear relationship between light and current, a special advantage of this type of cell, is maintained as long as the potential across the cell is above saturation value (fig. 3). This cell is very stable and maintains its characteristics under varying conditions and over a long period of time.

Lindemann electrometer.—The needle of the electrometer is observed under a low-power objective, the eyepiece of the microscope having a graduated scale. There is a linear relation between voltage and needle deflection provided the plate potential is kept at a certain value. This plate potential is set by earthing one plate (by the switch S in fig. 2) and adjusting the voltage on the other to give a reading of 28 scale divisions. The other plate is then raised to the same potential, thus restoring the needle to its zero position. (Each scale division on the ocular field = 0·1 mm.; the microscope has a magnification of 60 ×.)

The *colour filter* used was an Ilford No. 807; this gives a well-defined band in the green which is sufficiently narrow for Beer's law [1] to be approximately obeyed. Beer's law states that the concentration of a pigment has a linear relationship to the optical density provided the light used is monochromatic.

The *diluting fluid* used for the blood samples is 1% saponin in 0·04% ammonia. Previous workers (e.g., Steinmann [2]) have advocated the use of stronger ammonia for the purpose of shifting the hæmoglobin dissociation curve to the left in order to ensure complete conversion of hæmoglobin to oxyhæmoglobin; but at the higher concentrations of ammonia (0·4%) conversion from oxyhæmoglobin to methæmoglobin and then to hæmatin is faster than was first imagined, as the following figures show.

Ammonia concentrations	Oxyhæmoglobin percentage		
	8 min.	60 min.	120 min.
0·4%	98·6	96	94·2
0·04%	98·4	98	98

This observation has also been made by Szigeti.[3]

To prepare a *calibration curve*, whole blood of a known oxygen capacity, previously determined by the method of Van Slyke, was diluted with varying proportions of diluting fluid. The optical densities were measured in a cell with a fluid depth of 5 mm. The curve relating optical density to O_2 capacity was nearly straight between 10 and 120% Newcomer (fig. 4). The oxygen capacities of blood from different individuals may be the same, but their hæmoglobin concentrations determined by this method may vary by as much as 2%. Blood from the same individual, however, gives constant concentrations by this method. This discrepancy is probably due to the presence of pigments other than oxyhæmoglobin (e.g., methæmoglobin). Minute traces of CO Hb often present in human blood create no significant error in hæmoglobin determination owing to the close correspondence of the extinction coefficients of oxy- and carboxy-hæmoglobin with the colour filter used.

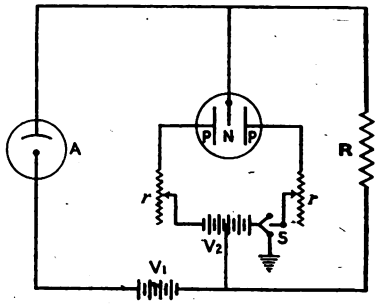

FIG. 2—Voltage-measuring circuit. A, photocell; N, electrometer needle; P, plates; r, plate potential resistances; S, switch for earthing one plate; R, 200 megohms resistance; V_1, 120-volt dry battery; V_2, 50-volt dry battery.

TECHNIQUE

In estimating hæmoglobin 20 c.cm. of the blood to be examined is diluted with 3 c.cm. of diluting fluid. Before the estimation is attempted the light must be switched on for at least 10 min., by which time the lamp has settled down to a constant illumination. If the illumination is constant there is no drift on the electrometer needle. The plate potential is adjusted as described above. The needle deflection caused by incident light (i.e., through filter B only) is then read (R_1). Then the needle deflection produced after transmission through the oxyhæmoglobin solution is read (R_2). A shutter is now placed in front of the cell, and the needle deflection when no light is transmitted is observed (R_3).

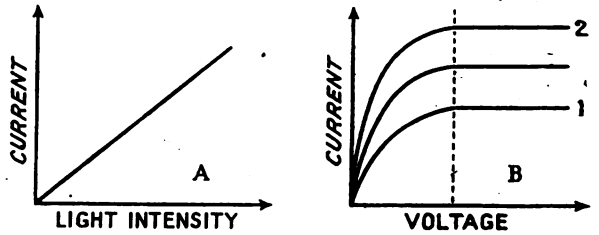

FIG. 3—Relation between voltage, current and light in a vacuum photocell. A, With voltages above saturation value current is proportional to light intensity. B, Relation between voltage and current for constant light (1) low light intensity (2) high light intensity. Note that unless a certain voltage ("saturation voltage") is maintained, the current is not independent of voltage for a given light intensity.

* Working on an M.R.C. grant.

1. Beer's law for monochromatic light: Optical density = $\log i_0/i = e\ c\ d = d\ (e_1c_1 + e_2c_2 \ldots)$. Where i_0 = incident light, i = transmitted light, e = specific absorption coefficient, c = concentration, d = thickness of solution.

2. Steinmann, B. *Arch. exp. Path. Pharmak.* 1938, **191**, 237.
3. Szigeti, B. *Biochem. J.* 1940, **34**, 1460.

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As previously stated optical density of cell + pigment + diluting fluid (where zero on the scale equals no light).

$$= \log \frac{\text{Reading obtained with incident light}}{\text{Reading obtained with transmitted light.}}$$

$$= \log \frac{R_1 - R_3}{R_2 - R_3}.$$

The optical density of the cell plus diluting fluid alone is determined in a similar manner. This latter factor, which is constant, is subtracted from the total optical density, the difference being the optical density of the pigment alone. The actual hæmoglobin percentage (Newcomer) may be read from the curve (fig. 4), or, over a small range, by multiplying by a constant factor, since the curve is almost a straight line. The reliability of the apparatus may be checked periodically by measuring the optical density of a standard neutral filter.

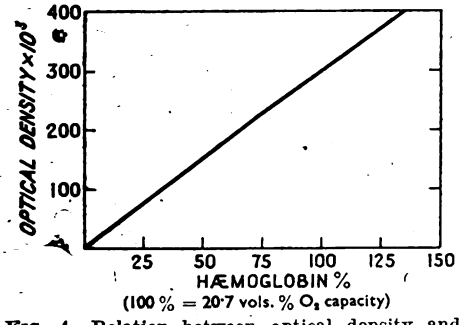

FIG. 4—Relation between optical density and oxygen capacity of blood. Hæmoglobin values (Newcomer) can be read off direct on horizontal scale.

The accuracy of the method has been tested by repeated determinations on samples of oxalated blood. The standard error is 0·4%.

TREATMENT OF BEDCLOTHES WITH DUST-LAYING OILS

USE OF OIL-IN-WATER EMULSIONS

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IT has previously been shown that very large numbers of dust-borne organisms are liberated from bedclothes during bedmaking, and we have described a method of reducing these which is effective both in the laboratory (van den Ende, Edward and Lush 1941) and in hospital wards (Thomas and van den Ende 1941, van den Ende and Spooner 1941). The method consisted of the application of pure, medicinal liquid paraffin to the bedclothing from a 30% solution of the oil in a light petroleum solvent (white spirit). Supplies of medicinal paraffin are, however, limited and its application from such an organic solvent introduces an unnecessary fire hazard. Moreover, the process is expensive unless the solution is recovered during the laundering process and used repeatedly, and recovery requires special installations and modifications to the usual hospital laundry plants. But the method, although perhaps unsuitable for adoption on a large scale, is highly effective in reducing the number of organisms distributed into the air during bedmaking. Its possible importance in preventing the spread of infection and the relative simplicity of the principles involved have stimulated further research. The results of experiments designed to find substitutes for liquid paraffin and to simplify the method of application form the subject of this paper.

USE OF TECHNICAL WHITE OIL

The shortage of paraffinum liquidum B.P. has recently led, in the fourth addendum to the B.P. 1932, to the introduction of paraffinum liquidum leve B.P. which is similar to the paraff. liq. leve B.P.C. 1934. This is a highly refined, inert mineral oil with a lower density and viscosity than the original oil, and represents the most refined type of what are known technically as "white oils." These white oils are available in considerable quantities, and we have used one differing from the new B.P. product only in having a higher acid value—that is, in being slightly less highly refined.*

We have confined our work to the more highly refined white oils, since the less refined yellow spindle oils, although equally effective, cheaper and more readily available, all possess carcinogenic properties to a greater or lesser degree. Carcinogenicity must obviously be excluded when an intimate contact between the oil and the patient's skin cannot be avoided. Mr. J. M. Twort of the Cancer Research Dept., University of Manchester, has tested the oils which we have used, and reports them to be non-carcinogenic.

Twort showed that the alteration of refractive index of many oils after intraperitoneal injection into mice is related to its carcinogenicity (Twort and Lyth 1935, Twort, Lyth and Twort 1937, Twort and Twort 1938). Non-carcinogenic oils remain unchanged or exhibit a very slight alteration (0·0003), while the refractive index of the highly active oils falls considerably (0·0040 to 0·0250 according to viscosity). The physical properties of the refined white oils referred to above and their specific refractive increments as tested by Mr. Twort are recorded in table I. Dr. W. E. Gye is testing these oils for us by direct painting experiments on mice.

For laboratory tests technical white oil was first applied from solution in white spirit in the same way as liquid paraffin in our earlier experiments. In addition, technical white oil with which had been incorporated 20% of ammonium oleate as an emulsifying agent ("soluble technical white oil") was applied in organic solution to determine whether the presence of a wetting agent in any way interfered with the dust-laying properties of the oil. The amount of oil absorbed by various textiles from solutions of different concentrations in white spirit was determined by ether extraction in a Soxhlet apparatus. It was found that woollen and cotton materials retained approximately 3% and 9% by weight respectively of the oil when soaked in a 20% solution in white spirit. This amount retained is slightly higher than the amount of medicinal liquid paraffin retained by the textiles after treatment with a 30% solution of liquid paraffin in white spirit. The appearance and feel of the textiles treated with technical white oil in this concentration are not appreciably altered.

To test the dust-laying effect, strips of the various textiles were infected either with a serum-broth culture of a Lancefield's group C hæmolytic streptococcus and allowed to dry in the incubator overnight, or with a powder of dried streptococci mixed with autoclaved floor dust. They were then mechanically beaten in a specially constructed machine, which was used also in earlier experiments with medicinal liquid paraffin (van den Ende, Edward and Lush 1941). The numbers of bacteria liberated from treated textiles were compared with those from similarly infected control strips, counts being made up to 12 min. after beating. The amount of visible dust liberated by the beating was roughly measured with a photoelectric attachment. The results of these experiments, which are summarised in table II, showed that both ordinary and soluble technical white oil were efficient dust-layers. Applied in a 20% solution, the mean reduction was 96·6% for dry and 100% for wet organisms. This reduction is as good as that previously obtained with a 30% solution of liquid paraffin in white spirit.

OILS APPLIED FROM STABLE WATERY EMULSIONS

The textile industry employs a wide variety of oil-in-water emulsions during spinning to ensure pliability of the yarn; this oil is later removed by washing the woven fabric in water. The use of similar emulsions for the application of dust-laying oils to bedclothes would greatly simplify the oiling process and reduce the expense of the process. Organic solvents are unnecessary and the oil can be added to the rinsing tank, thus obviating the necessity for additional laundry equipment. Furthermore the ease of washing bedclothes treated with "water-soluble" oil instead of ordinary liquid paraffin greatly simplifies the laundering of bedclothes after use.

Preliminary experiments with "soluble" oils showed that the nature of the emulsion was of prime importance.

* This oil, refined by the Manchester Oil Refinery Ltd., was supplied to us by Stemco Ltd., and is referred to as "Technical White Oil." Other white oils which are available include "Marcol" and "Wyrol B" (both of American manufacture) and "Puremore" (English manufacture).

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TABLE I—PHYSICAL PROPERTIES OF SOME "WHITE MINERAL OILS"

Oil	Density	Redwood viscosity (sec.)		Kinematic viscosity (Centistokes)		Refractive index *	Refractive increment (mouse test) *	Biological activity
		70° F.	100° F.	37° C.	25° C.*			
Paraff. liq. B.P. 1932	0·880–0·895	810	260	..	..	..	..	..
Paraff. liq. leve B.P. (4th add 1941	0·835–0·875	Not defined		37·1	..	..	..	..
Technical white oil (English)	0·865	125	71	33·1	27·6	1·4645	0·0002	Inert
Technical white oil "Marcol" (American)	0·850	140	76	36·6	28·0	1·4648	0·0001	Inert
Technical white oil "Puremore" (English)	0·850	..	..	..	25·7	1·4704	Nil	Inert

* Mr. J. M. Twort has kindly supplied these figures.

Oils emulsified with oleates and stearates alone were unsuitable, since the final emulsion was not stable in the centrifuge. These dense white emulsions broke down in the hydro-extractor, the result being an uneven oiling of the clothing. We came, therefore, to regard any opaque creamy white emulsion as unsuitable. The majority of commercial oils and those prepared with many of the commercial emulsifiers fell into this class and were discarded without further investigation. A number indeed had to be discarded earlier on account of the low degree of refinement of the mineral oil used in their manufacture. Some were crude kerosenes, others spindle oils with the addition of suitable emulsifiers. These crude oils were not applied to bedclothes on account of their potential carcinogenic activity. A number of commercially available oils prepared from high-grade white oils were supplied to us in translucent, centrifuge-stable emulsions in water. Two of them (Olinol nos. 1 and 2) have been used in hospital trials as well as in laboratory tests. These contain 35% and 65% respectively of white oil emulsified with sulphonated naphthenic hydrocarbons which in themselves may have some bactericidal action. Mr. J. M. Twort tested a sample of olinol no. 1 for us, and found that there was a very slight fall in refractive index (0·0016) after recovery from injected mice.

The general principles underlying the preparation of stable oil-in-water emulsions have been extensively investigated (Schulman and Cockbain 1940, Alexander and Schulman 1940, Rideal and Schulman 1939). Briefly, to obtain a stable emulsion, the emulsifying complex must contain an oil-soluble and water-soluble fraction. Under these conditions, molecules of both types are held at the oil water interface, and the emulsion remains stable. Much of their work on mineral oil ("Nujol") emulsions was done with long chain alcohols and higher alkyl sulphates as the oil-soluble and water-soluble agents respectively. On this basis we have been able to prepare emulsions of "white oils" in water in which the oil dispersion is so fine that the final emulsion is almost transparent. For these experiments we tested a number of emulsifying and wetting agents—cetyl alcohol, cetyl pyridinium bromide, sodium lauryl sulphonate, triethanolamine oleate, oleic acid, ammonium oleate, sodium and aluminium stearate, and a large number of commercial agents. We finally found that the most suitable solutions or permanent fine emulsions could be prepared from technical white oil, cetyl

TABLE II—DUST-LAYING EFFECT OF "TECHNICAL WHITE OIL"

Material	Test organism	Percentage oil used for treatment	Bacterial counts (untreated textile)		Bacterial counts (treated textile)		Amount of visible dust liberated		Per cent reduction in bacterial counts	
			A	B	A	B	untreated	treated	A	B
Wool ..	Streptococcus C sprayed	10 TW	450	152	40	3	++	tr	91·1	98·0
,, ..		20 TW	,,	,,	90	0	,,	—	80·0	100
,, ..		30 TW*	,,	,,	20	0	,,	—	95·5	100
Wool ..	Dry streptococcus C	10 TW†	1550	336	177	5	+++	+	88·5	98·5
,, ..		20 TW†	,,	,,	?112	1	,,	—	? 92·7	99·8
,, ..		30 TW†	,,	,,	97	2	,,	—	93·7	99·4
Cotton (sheet)	Streptococcus C sprayed	10 TW	2400	1050	160	7	++++	+	93·2	99·4
,, ..		20 TW	,,	,,	60	1	,,	tr	97·5	99·9
,, ..		30 TW	,,	,,	?	5	,,	—	..	99·5
Wool ..	Dry streptococcus C ‡	10 STW†	1600	308	418	40	++++	tr	73·8	86·9
,, ..		20 STW†	,,	,,	262	19	,,	—	83·5	93·8
,, ..		30 STW†	,,	,,	256	6	,,	—	84·0	98·0
Cotton (sheet)		10 STW	912†	104†	288	3	++++	—	68·4	97·1
,, ..		20 STW	,,	,,	100	3	,,	—	89·1	97·1
,, ..		30 STW	,,	,,	44	0	,,	—	95·2	100

TW = technical white oil. STW = technical white oil with 20% emulsifier (ammonium oleate). A = during the first 2 min. after beating. B = during the 5 min. period 7–12 min. after beating. * = too greasy to the touch. † = average of two experiments. tr = trace. ‡ = only results of experiments in which dry streptococci were used are given. The results of experiments with sprayed organisms were better, but since this effect can be attributed partly to the bactericidal action of the emulsifier against wet organisms the results cannot be included in tests for dust-laying power.

TABLE III—DUST-LAYING EFFECT OF OILS (OLINOL 1 AND 2) APPLIED FROM FINE STABLE WATERY EMULSIONS

Material	Test organism	Percentage oil (in water) used for treatment	Bacterial counts (untreated textile)		Bacterial counts (treated textile)		Amount of visible dust liberated		Per cent reduction in bacterial counts	
			A	B	A	B	untreated	treated	A	B
Wool ..	Dry streptococcus C	12·5 oil 1	488	96	264	12	++	tr	45·8	87·5
,, ..		25 ,,	,,	,,	28	4	,,	—	94·3	95·8
,, ..		50* ,,	,,	,,	9	0	,,	—	98·1	100
Wool †† ..		20 ,,	1896	396	93	10	++	? tr	95·2	97·5
Cotton (sheet)		12·5 ,,	2400	672	1040	60	+++	+	56·6	91·1
,, ..	Streptococcus C sprayed	12·5 ,,	432	84	5	0	+++	tr	98·8	100
,, ..	Dry streptococcus	25 ,,	944	116	108	2	++++	—	88·6	98·4
,, ..	Streptococcus sprayed	25 ,,	368	50	2	0	++	? tr	99·4	100
Wool ..	Dry streptococcus	12·5 oil 2	488	96	100	2	++	—	79·5	97·9
,, ..		25 ,,	,,	,,	41	1	,,	—	91·5	99·0

A = during the first 2 min. after beating. B = during the 5 min. period 7–12 min. after beating. * = too greasy to the touch. †† = samples of actual blankets used in hospital trials.

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alcohol, Turkey red oil (sulphonated castor oil), ester salts (a homologous group of secondary higher alkyl sulphates with a carbon chain length of 10 to 18), and cresylic acid in various proportions. Details of two oils (nos. 8 and 12) prepared with these ingredients are:

Oil No. 8	Parts by weight
Sulphonated castor oil (50% neutral finish)	210
Technical white oil	105
Ester salts solution (25% active materail in water)	105
Cetyl alcohol ..	30
Cresylic acid ..	50

Oil No. 12	Parts by weight
Sulphonated castor oil (50% neutral finish)	225
Technical white oil	175
Ester salts powder (60% active material)	70
Cetyl alcohol ..	70
Cresylic acid ..	70

Dissolve cetyl alcohol in technical white oil with aid of heat, stir in sulphonated castor oil, followed by ester salts and cresylic acid. Sodium sulphate deposits in oil no. 12 on standing and the clear oil is decanted next day. These oils are a clear dark brown colour and give instantaneous, transparent emulsions in water. Sulphonated castor oil, although soluble in water in all proportions, is not suitable for application alone to fabrics, as it renders them rather hard and sticky and is by itself not an efficient dust-layer.

LABORATORY TESTS WITH OIL-IN-WATER EMULSIONS

Dust-laying effect.—Laboratory tests were made with the following soluble oils: oil no. 8, oil no. 12, olinol no. 1, olinol no. 2, Amoa A3 mixed with an equal volume of technical white oil, sulphonated castor oil (50% neutral finish) and sulphonated castor oil containing 10% cresylic acid. The results were compared with those obtained with technical white oil applied from solution in white spirit. Textiles treated with various concentrations of these oils were also assayed for their content of ether-soluble oil by extraction in a Soxhlet apparatus. Blankets treated with a 20% solution of oil no. 8, amoa and technical white oil, olinol and olinol no. 2 absorbed approximately the same amount of ether soluble oil as blankets treated with a 20% solution of technical white oil in white spirit. The dust-laying effect of these oils was tested in the same way as previously described for technical white oil.

TABLE IV—BACTERICIDAL ACTION OF OILS IN BROTH AGAINST VARIOUS ORGANISMS. CONTACT FOR 24 HOURS AT 37° C.

The figures refer to the highest dilution of the oil in broth which is bactericidal.

Oil or emulsifier	B. hæmolytic streptococcus Group C	*Staphylococcus aureus*	*Bact. coli*	*Proteus*	*Ps. pyocyanea*
No. 8 ..	1280	640	1024	512	256
No. 12 ..	1280	640	1024	256	128
Olinol 1 ..	640	160	256	128	64
Technical white oil + Amoa A3	320	160	256	128	128
Amoa A3 ..	640	160	1024	256	256
Ester salts ..	320	320	Not tested		
Crude naphthenic sulphonates	1280	1280	,, ,,		

The results of these tests (table III) show that the dust-laying effect of oil applied from fine emulsions in water is as striking as that of oil applied from organic solutions. The oil treatment had apparently a much greater effect in preventing dust-borne infection from the fabrics infected with sprayed organisms than from those in which the fabric was treated with dry organisms. This was subsequently shown to be due to the bactericidal action of the various emulsifiers, and presents an added advantage where the natural infection of blankets, &c. depends on the deposition of relatively large, moist droplets from the upper respiratory tract. This bactericidal action is borne out by direct tests, and is also apparent in hospital trials with blankets oiled by this method.

The *bactericidal action* of the oils, and of the crude emulsifying agents, was tested against *Streptococcus pyogenes* (group C), *Staphylococcus aureus*, *Proteus*, *Bacterium coli* and *Pseudomonas pyocyanea*, both in vitro and after application to blankets. For tests in vitro serial dilutions of the oil in broth were inoculated with a standard dose (about 2 million) of an overnight culture of the test organism, and stroke cultures were made on appropriate solid media after varying incubation times up to 24 hr. Subcultures were also made into broth of sufficient volume to avoid the bacteriostatic effect of the oils. All the oils tested were bactericidal in high dilutions, oils nos. 8 and 12 proving the most potent. This is probably due to the fact that they contain cresylic acid as well as the emulsifying agent. *Strep. pyogenes* and *Bact. coli* were most easily killed, *Staph. aureus* and *Proteus* being more and *Ps. pyocyanea* most resistant (table IV). Dilutions of 1/64, however, killed all the organisms in every case.

This antiseptic action in broth is paralleled by the activity on blankets against wet organisms (table V). To show this, strips of blanket were oiled in the usual manner, and small squares were equally inoculated either with a coarse spray of a serum broth culture of *Strep. pyogenes* (group C) or with a mixture of dried organisms and sterile, finely sieved dust. The strips were left overnight, then small squares (1/9 sq. in.) were cut from the centre of each and transferred to screw-capped bottles containing 100 ml. broth and a number of glass beads. These were shaken vigorously for 10–15 min., and appropriate amounts were plated out into blood-agar. Colonies were counted after 48 hr. aerobic incubation. Control tests were made with untreated blanket and with blanket treated with technical white oil in white spirit (which has no bactericidal activity). In all cases with the wet organisms, the final counts showed a minimum kill of 99·5%. With dry organisms there was less striking reduction. The greatest was with oil no. 8, which gave total counts of approximately 300,000 per blanket.

TABLE V—BACTERICIDAL EFFECT OF DUST-LAYING OILS AND EMULSIFYING AGENTS ON A WOOLLEN BLANKET AGAINST WET AND DRY STREPTOCOCCI

Treatment of blanket	Plate counts A	Plate counts B	Total organisms in test fabric	Per cent. reduction
IMPREGNATION WITH COARSE SPRAY OF SERUM BROTH CULTURE				
Technical white oil in white spirit ..	7700	Uncountable	154,000	
Oil No. 8	0	0	0	100
Oil No. 12 ..	0	0	0	100
Olinol 1	2	2	40	99·9
Technical white oil and Amoa A 3 ..	48 34	30 43	780 770	99·5 99·5
Turkey red oil ..	43	27	700	99·5
Turkey red oil and 10% cresylic acid	4	7	110	99·9
IMPREGNATION WITH DRY STREPTOCOCCI AND STERILE DUST				
Technical white oil In white spirit	1: 4000 2: 560	3920 482	$15{\cdot}84 \times 10^6$ $20{\cdot}84 \times 10^6$	
Oil No. 8 ..	1: 71 2: 14	64 11	$0{\cdot}27 \times 10^6$ $0{\cdot}5 \times 10^6$	97·9
Oil No. 12 ..	1: 220 2: 23	254 16	$0{\cdot}95 \times 10^6$ $0{\cdot}78 \times 10^6$	95·3
Olinol 1 ..	1: 432 2: 51	424 37	$1{\cdot}71 \times 10^6$ $1{\cdot}76 \times 10^6$	90·4
Technical white oil and Amoa A 3 ..	1: 1864 2: 143	1928 129	$7{\cdot}58 \times 10^6$ $5{\cdot}44 \times 10^6$	64·5
Turkey red oil	1: 2000 2: 270	2224 294	$8{\cdot}45 \times 10^6$ $11{\cdot}28 \times 10^6$	46·2
Turkey red oil and 10% cresylic acid ..	1: 1016 2: 96	880 104	$3{\cdot}79 \times 10^6$ $4{\cdot}00 \times 10^6$	78·8

A and B are duplicate samples. 1 = no. of organisms from 0·5 c.cm. of a 1/20 dilution of the broth washings of the test fabric. 2 = no. in 0·5 c.cm. of a 1/200 dilution.

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square compared with control counts of 18 million. These tests with dry organisms were, however, subject to a number of possible errors which make their interpretation difficult. The size of the test squares and the infecting dose were judged as carefully as possible, but when infection of the fabric (far greater than is likely to occur naturally) is produced with a dry powder of streptococci, even small errors in measurement of infective dose would produce a large final difference. Moreover, there is the possibility that in spite of vigorous shaking the organisms in the depths of the fabric are not liberated sufficiently quickly, so that on contact with the broth the oil would exert its bactericidal action as against wet organisms. The reduction in bacterial count after application of dry organisms has, however, been shown repeatedly; and it seems reasonable to conclude that some bactericidal action was shown against dried organisms, although it was not as great as against organisms applied in the presence of moisture.

HOSPITAL WARD EXPERIMENTS

Two clean sets of blankets, sheets, pillow-cases, counterpanes and pyjamas, each sufficient for a single bed cubicle, were treated with olinol no. 1 and no. 2 respectively. Each set of bedclothes was thoroughly soaked in a 20% water solution of the oil, spun in a hydro-extractor and finally dried in the hot-air drying chamber.

Our experimental work in hospitals has so far been done with initially clean bedding, and we have used a separate soaking tank for applying the oil (as a 20% solution). This is unnecessary when one has to deal with dirty "linen" which is being washed in the ordinary laundry rotary washing machine. These machines perform the complete washing and rinsing process without removal of the linen, and it is usual to finish with one warm and two cold water rinses. The amount of water used is measured in inches by an indicator on the back of the machine; it is not difficult to calculate the amount of water introduced for the final cold rinse in gallons, and also the amount of oil which has to be added to this to give a 20% solution. This amount of oil can then be added through a vent, with which all the machines are fitted, at the beginning of the last rinse for each charge of linen. There is thus no need to open the machine at all. A run of 8–10 min. is sufficient to ensure impregnation of all the clothing, which can then be transferred to the hydro-extractors and spun. The effluent from these can be collected in a tub by substituting a right-angled outflow instead of the usual vertical one which normally runs direct to waste (the outflow is only fixed by two bolts through a gasket, so that such an alteration is simple and inexpensive). When sufficient has been collected in the tub, the first cold rinse in the washing machine can be let out, and instead of filling up with cold water and fresh oil, the machine opened and the contents of the tub tipped in for the second rinse. This process can be repeated several times and results in very little waste.

Two extra blankets were included with those for the trial with olinol no. 1. One of these was cut in two, half being left untreated as control and the other half treated. These halves were used in laboratory tests for assay of oil content and dust-laying properties. The treated half was found to contain 3·35% and the control 1·6% of ether-extractable oil.

The presence of 1·6% of ether-soluble oil in untreated blankets is unusual unless the blankets are new. Usually after repeated washing hospital blankets contain less than 1% of "oil." A sample of the natural oil which has been extracted with ether in a Soxhlet apparatus has been tested for us by Dr. C. Rimington. He concluded that it was probably lanolin. Reapplied to a repeatedly washed blanket strip it resulted in moderately effective dust-laying. Similarly a dust-laying effect is observed after the application of commercial lanolin. The application of lanolin, however, requires the use of organic solvents, and the texture of textiles treated with it is somewhat unpleasant in comparison with that after mineral oil treatment.

The dust-laying effect of the treatment was also shown in laboratory tests on strips of these blanket samples (table VI). The second blanket was also divided in two and both halves were treated. Half was placed at the periphery of the hydro-extractor and the other half at the centre, both being subsequently assayed for oil content. The object of this was to determine whether this method of soaking and centrifugation resulted in a uniform impregnation of the blankets. That this is so is shown by the fact that the peripheral and central halves contained 3·3% and 3·4% respectively of ether-soluble oil.

TABLE VI—DUST-LAYING EFFECT OF VARIOUS OILS AND EMULSIFYING AGENTS ON STRIPS OF HOSPITAL BLANKET

Test organism: dry streptococci

Treatment	Bacterial counts		Visible dust liberated	Per cent. reduction in bacterial counts	
	A	B		A	B
None	340	180	++		
20% Turkey red oil in water	224	60	+	34·1	66·7
20% technical white oil in white spirit	9	1	–	97·4	99·4
20% oil no. 12 in water	28	0	–	91·7	100
20% oil no. 8 in water	35	3	–	89·7	98·2
20% (Amoa A 3 + technical white oil equal parts) in water	4	0	–	98·8	100
20% (Turkey red oil + 10% cresylic acid) in water	290	42	+	14·7	76·7

A, during the first 2 min. after beating; B, during the 5-min. period 7–12 min. after beating.

Oil assays were also made on the liquor from the soaking tank as well as from the hydro-extractor outflow at the beginning, during, and at the end of its run. The amounts of ether-soluble material recovered from these samples did not differ significantly. It was concluded, therefore, that the liquor recovered from the hydro-extractor can justifiably be returned to the soaking tanks for further use.

On the day on which the bedding was treated, two patients were admitted to single-bed cubicles (similar to those used in our previous experiments). One was suffering from acute streptococcal tonsillitis (type 12/27) and the other from facial erysipelas (streptococcus type 3). The cubicles were carefully cleaned, the floors treated with spindle oil, and the men placed in clean bedclothes from the linen store. The patients were left for 48 hr., when air-counts were made on 5 c.ft. volumes of air before, during and after vigorous bedmaking. Air samples were taken on to gentian-violet blood-agar plates with a slit sampler (Bourdillon, Lidwell and Thomas 1941). The colonies were counted after 24 hr. aerobic incubation of the plates. All the bedding was then removed, the oiled bedclothes substituted and similar counts made daily for 8 days. In each cubicle the control counts were approximately 2000 per c.ft and large numbers of type-specific streptococci were recovered from the air during and after bedmaking. The mean reduction of organisms liberated from the oiled blankets during vigorous bedmaking was 99·4% and 98·5% in the two cubicles respectively. It is significant that at no time during the period when treated bedclothes were used was a single streptococcus recovered from the air in spite of the fact that the organism could constantly be isolated from both patients. In our previous experiments with liquid paraffin, although treatment of bedclothes with the oil resulted in reduction in numbers, we usually recovered small numbers of streptococci from the air during the test period, and these numbers tended to increase with time. It seems reasonable to conclude therefore that the oil had exerted a bactericidal action on the streptococci deposited on the blankets. This finding could best be accounted for if the streptococci were deposited in a moist state, as would be the case if they were deposited in large droplets from the respiratory tract.

The reduction of the numbers of air-borne bacteria was not wholly due to this bactericidal action, but was at least in part due to the reduction in the amount of dust liberated from the bedclothes. This could be shown by collecting with a slit sampler the dust liberated by shaking the blankets, on stationary glass slides instead of rotating plates of nutrient medium.

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DISCUSSION

Our experiments have shown that mineral oils other than liquid paraffin may be used to lay the dust on bedclothes. A number of these oils are available. The cruder ones, such as the spindle oils, are carcinogenic and unsuitable for application to bedclothes where intimate contact between the patient's skin and the oil are unavoidable. The dermatitic factor has also to be considered, and while more highly purified and inert oils are available these should be used. Such oils are the highly refined white oils, and all the oils of this type which we have tested have proved to be efficient dust-layers.

The fact that these oils, with the aid of suitable wetting and emulsifying agents, can be made to give centrifuge-stable emulsions with water overcomes the original difficulty of application from an organic solvent, and makes large-scale treatment of bedclothes a practical possibility in hospital laundries. We have shown that these oil-in-water emulsions are almost as efficient dust-layers as the oils applied from white spirit, and that the emulsifiers used are themselves bactericidal under natural conditions. This action is most pronounced against wet organisms and is relatively slight against dry bacteria.

The killing of dried organisms is probably not of such practical importance as the killing of those in the large, moist droplets exhaled from the upper respiratory tract. Hare (1940) demonstrated a downward stream of such droplets from the mouth and nose of infected persons, and from the numbers of streptococci which we have previously shown to accumulate in blankets in relatively short times, each of these droplets must contain very large numbers of organisms. Bourdillon and Lidwell (1941), by means of flash photography, have shown that the number of large droplets expelled during a sneeze is enormous, and since a person normally lowers his head when sneezing the number of organisms projected on to the bedclothes when a person in bed sneezes is very great. Under normal circumstances these droplets would then dry and remain as potentially infective particles to be liberated when the bedding is shaken. It is important that bedclothes treated with the soluble oils not only retain most of the organisms within the actual fabric but also kill the organisms in these droplets before they can dry. Furthermore, the application of oils from stable watery emulsions renders the process much less expensive, frees it from the danger of fire, and makes it practicable even for modestly equipped hospital laundries.

SUMMARY

Technical white oils are effective dust-layers for bedclothes and are not carcinogenic.

These oils can, by the use of suitable emulsifying and wetting agents, be made to give centrifuge-stable emulsions in water. Such oil-in-water emulsions provide an easy method of applying the oil to bedclothes, and a large-scale method is outlined.

The emulsifying agents used in making these "soluble" oils impart to the bedclothes potent bactericidal activity which has been shown to be effective against moist droplets both in the laboratory and in hospital trials. Their bactericidal action against dry organisms was slighter.

The use of soluble oils in hospital trials resulted in a 99% reduction in the number of organisms liberated during bedmaking. No hæmolytic streptococci were liberated from the treated bedclothes of two patients with hæmolytic streptococcus infections. This can be explained at least in part by the bactericidal action of the oil against moist organisms, especially if the infection of the bedclothes is regarded as being derived from large droplets from the respiratory tract.

We are indebted to Mr. J. W. C. Phillips for his advice and interest; Mr. J. M. Twort and Dr. W. E. Gye for testing the carcinogenic properties of our oils; Dr. S. D. Elliott for typing our streptococcal strains; Dr. J. H. Schulman and Mr. J. E. Lovelock for help in preparing the soluble oils; Dr. C. Rimington, Dr. C. H. Andrewes and Dr. R. B. Bourdillon for much other help and advice; Brigadier L. T. Poole, director of pathology, A.M.S., and Colonel E. B. Marsh for allowing one of us to take part in this work, and to the managing directors and technical staff of Amoa Chemical Co. Ltd., A. Boake Roberts & Co. Ltd., Olinol Ltd., Stemco Ltd. and Technical Products Ltd. for supplying many of the oils and emulsifiers.

REFERENCES

Alexander, A. E. and Schulman, J. H. (1940) *Trans. Farad. Soc.* **36**, 960.
Bourdillon, R. B. and Lidwell, O. M. (1941) *Lancet*, **2**, 365.
— — and Thomas, J. C. (1941) *J. Hyg., Camb.* **41**, 197.
Hare, R. (1940) *Canad. publ. Hlth, J.* **31**, 539.
Rideal, E. K. and Schulman (1939) *Nature, Lond.* **144**, 100.
Schulman and Cockbain, E. G. (1940) *Trans. Farad. Soc.* **36**, 651.
Thomas, J. C. and van den Ende, M. (1941) *Brit. med. J.* **1**, 953.
Twort, C. C. and Lyth, R. (1935) *J. Hyg., Camb.* **35**, 125, 404.
— — and Twort, J. M. (1937) *Ibid*, **37**, 14.
— and Twort, J. M. (1938), *Ibid*, **38**, 255.
van den Ende, M., Edward, D. G. ff. and Lush, D. (1941) *Lancet*, **1**, 716.
— and Spooner, E. T. C. (1941) *Ibid*, p. 751.

HYPERCHROMIC ANÆMIA IN AN INFANT

RESPONSE TO LIVER EXTRACT

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LIVER extract is not often used in the treatment of anæmia in infancy and reports of success are few. This case is being reported because, when the chance of recovery seemed slight, a single dose of Anahæmin was followed by steady improvement and evidence of blood regeneration. It is regrettable that the records are incomplete, for the first blood-count was done 48 hours after the liver extract had been given.

Bachman [1] described a case of macrocytic hyperchromic anæmia in an infant aged nine months and reviewed 17 others from the literature, of which 7 including his own were treated and appeared to respond to liver extract. All 7 improved or recovered; 3 were not followed up but there was no immediate recurrence when it was discontinued in 3 of the other 4. Langmead described a case of pernicious anæmia in an infant aged thirteen months with severe hyperchromic anæmia, megalocytosis, icterus index 17·6 units, achlorhydria in response to histamine and a reticulocyte response of 19% to Campolon. Smallwood [3] refers to a case of subacute hæmolytic anæmia which recovered only when liver treatment was begun, but did not relapse when it was discontinued; he considered that this was due to temporary exhaustion of anti-anæmic principle after a long period of hæmolysis and erythrogenesis. In no case described does the anæmia appear to have been more than a temporary effect; once the anæmic crisis has been tided over by liver or blood-transfusion maintenance treatment with liver has not been shown to be necessary. This is in contrast to the pernicious anæmia of adults, where deficiency is nearly always permanent and treatment has to be continued to prevent relapse.

CASE-HISTORY

A girl, aged 3 weeks. No history of anæmia in the family. No apparent deficiency in the mother's diet. This was her first child. Pregnancy normal; breech presentation with easy delivery, birth weight 7¼ lb. The child did not suck well and was breast-fed for only a week. She was then given half-cream Cow and Gate, seven feeds daily. She failed to make progress so this was changed to albumin water, 3 oz., alternating with diluted cow's milk, 3 oz. (2 parts milk to 3 parts water.) The stools were inclined to be loose and on one occasion contained blood, and there was occasional vomiting. On admission on May 16, 1941, the child was very ill and rather dehydrated. Temperature 104° F., pulse-rate 160, respirations 40–60. Signs of general bronchitis and a suggestion of bronchopneumonia. Spleen not palpable and liver not enlarged. Stools loose, numerous and occasionally dark. Bowels often open after feeding. Never any trace of jaundice. Urine normal. Diagnosis: bronchitis and possibly bronchopneumonia. Weight on May 26, 6 lb. 10 oz. Diet: from May 16 until June 6 she was given Frailac two or three hourly; from June 7 she was graded on to half-cream Cow and Gate three hourly; on June 18 additional Dextrimaltose was added to each feed, and this was continued until

1. Bachman, A. L. *Amer. J. Dis. Child.* 1936, **52**, 633.
2. Langmead, F. S. *Lancet*, 1937, **1**, 1048.
3. Smallwood, W. C. *Practitioner*, 1939, **142**, 453.

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her discharge. During the first 24 hours 0·75 g. of sulphapyridine was given by the mouth. Since there was no response 3 c.cm. of azosulphamide (Prontosil Soluble) was given intramuscularly on May 17 and 0·75 g. of sulphanilamide daily until May 22. The daily dose was then halved until May 25 when it was stopped. There was considerable improvement and the temperature became normal on May 18 and remained so until the 27th. There was no gain in weight, however, and the stools on the 20th gave a strong reaction for occult blood. On the 27th the temperature rose again to 103° F. and an empyema was suspected, but radiography of the chest showed no evidence of lung disease. The stools then became more frequent and on May 30 a small amount of visible blood was passed. Vitamin K, 0·5 c.cm., was then given intramuscularly. During the next three days the temperature remained up and the general condition rapidly deteriorated. On June 2 obvious anæmia was apparent for the first time. The baby was then desperately ill with a temperature of 103° F. and an almost uncountable pulse. It was clearly no use giving iron by the mouth, and blood-transfusion was out of the question, so 1 c.cm. of anahæmin was given intramuscularly. Twenty-four hours after this injection there was an astonishing change, the whole clinical condition improved, dehydration and diarrhœa became steadily less, and the child began to take her feeds better and to gain weight for the first time. This progress continued without interruption until discharge. Within a week the stools had become almost normal in number. Her weight chart and blood-counts are shown in fig. 1. By the beginning of July she weighed 7½ lb., seemed healthy in every way and has remained well since without further treatment.

BLOOD-COUNTS AFTER ANAHÆMIN, 1 C.CM., HAD BEEN GIVEN ON JUNE 2

—	June 4	June 21	July 3	July 17
Red cells ..	2,065,000	3,840,000	5,140,000	6,300,000
Hæmoglobin ..	54%	62%	84%	98%
Colour-index ..	1·24	0·82	0·82	0·83
White cells ..	15,600	17,000	24,000	
Polymorphs	6085 (39%)	5400 (32%)	6480 (27%)	
Eosinophils ..	465 (3%)	340 (2%)	960 (4%)	
Lymphocytes	8425 (54%)	9860 (58%)	14,400 (60%)	
Mononuclears	0	850 (5%)	2160 (9%)	
Myelocytes ..	465 (3%)	510 (3%)	A few immature polymorphs	
Myeloblasts ..	160 (1%)			
Normoblasts ..	1 per 6 200 5 white cells	20		
Megaloblasts ..				
Primary erythroblasts				

The blood-count findings are shown in the table. Price-Jones curves are in fig. 2. On June 12 blood films showed considerable megalocytosis and variation in size of red cells; megalocytes 12%, microcytes 1%; mean diameter 7·6 μ. On July 10 there were very few megalocytes (1%) and less variation in size of red cells; megalocytes 1%, microcytes 1%; mean diameter 7·3 μ. Reticulocytes: June 9, 22·5%; June 12, 17·8%; June 14, 17·5%; June 21, 5·6%; July 3, 4·4%; July 10, 1·9%. Fragility on July 11: hæmolysis begins at 0·38% saline and is complete at 0·26%.

Fractional test-meal on June 25: 30 c.cm. 3½% alcohol, no histamine given; 0·036 free hydrochloric acid present in sixth sample. Wassermann reaction, negative.

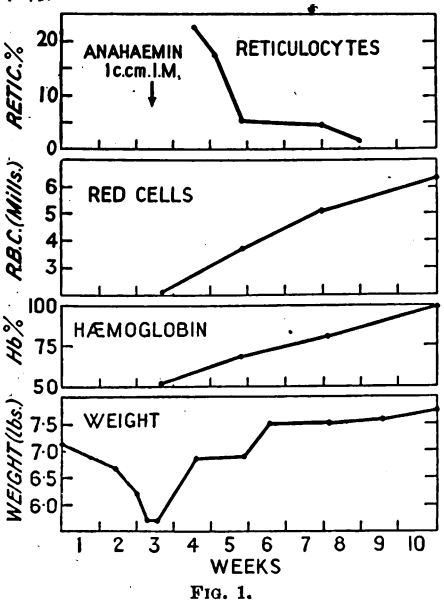

FIG. 1.

DISCUSSION

In this case the sudden onset of anæmia may have been due to hæmorrhage but was probably partly hæmolytic. From its response to treatment it appears to have been due essentially to a temporary lack of anti-anæmic principle or one of its precursers, for the diet was qualitatively unchanged for a fortnight before anahæmin was given until recovery was well advanced. The only additional treatment was a single injection of vitamin K four days before the anahæmin, and during this four days progress was rapidly downhill. The cause of the deficiency is difficult to explain. For the first three weeks of life the diet was certainly deficient in total calories, proteins, vitamins and iron, and as there was also a severe general infection with considerable intestinal disturbance absorption was also probably impaired. There was also some loss of blood from the intestinal tract. Such a combination in a child of this age is by no means rare but it causes hypochromic anæmia, and not hyperchromic anæmia as in this case. Two other possibilities remain—first, that the child started life with deficient stores of anti-anæmic principle; secondly, that treatment with sulphapyridine and sulphanilamide were contributory factors. It might also be argued that the recovery was not due to liver extract but was spontaneous, but the striking reticulocyte response is against this. The Price-Jones curves although they show some degree of megalocytosis, becoming less after treatment, are within normal limits for the age of the patient.

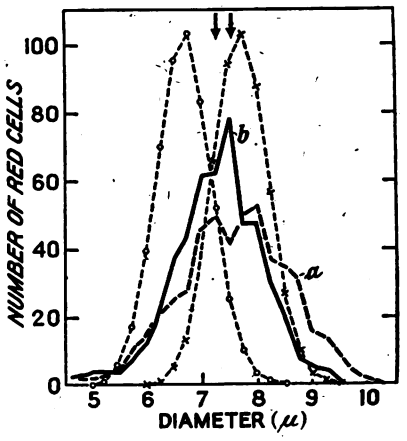

FIG. 2.

SUMMARY

A case of hyperchromic anæmia in an infant is described in which complete clinical and hæmatological recovery followed a single injection of anahæmin.

No qualitative alteration in the diet was made for a fortnight before anahæmin was given or until recovery was well advanced, and apart from a single previous injection of vitamin K, which did not seem to have any effect, no other vitamin preparations, iron or other treatment were given until the red cells were over 6,000,000 and the hæmoglobin was 98%.

I am indebted to Dr. C. H. Whittle for the blood-counts and Dr. W. Jacobson for the Price-Jones curves.

IN his annual report for ECCLES Dr. J. E. Spence states that 90 samples of milk were examined under the Sale of Food and Drugs Act of 1938, and 10 of them were found faulty; 49 samples of other foods were taken of which 2 were unsatisfactory; 4 samples of milk were taken from the same source and found to contain between 19·1 and 23·3% added water (appeals to the cow established bovine innocence and human fraud). Fines and costs totalling £22 2s. were imposed. What proportion of the profits of the swindle was refunded by the fine? Two-thirds of the work entailed by the Food and Drugs Acts is now absorbed by milk, and four-fifths of the sophistication detected is practised on milk, because the penalties imposed when a conviction is obtained are so trivial and the profits of the fraud so considerable that milk watering is a highly profitable business and the courts by the smallness of the fines they impose make it almost respectable. This is a particularly dangerous form of fraud, for many people are absolutely dependent on milk for their nutrition and may starve for no apparent reason if their milk is watered. It has been suggested that the fraud comes near to constructive murder and should be punished as such.

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Medical Societies

BIOCHEMICAL SOCIETY

AT a meeting of this society on Nov. 29, with Prof. E. C. DODDS in the chair, a discussion on the

Mode of Action of Chemotherapeutic Agents

was opened by Dr. G. M. FINDLAY. Chemotherapeutic action, he said, may be classified as direct or indirect. Except in the case of parasites present in the intestinal canal it is essential that the chemotherapeutic drug should be absorbed into the body, that it should penetrate to the site where the parasites are acting, and that it should not be excreted or converted too rapidly into an inert form. Time must be allowed for chemotherapeutic action and in some cases for the conversion of the compound from an inactive into an active form. Once the drug and the parasite have been brought face to face three stages may be distinguished—adsorption, interference with metabolism, and death or such injury to the parasite that it is destroyed by the phagocytes of the host. An absorbed chemotherapeutic drug may prevent an essential food factor from being adsorbed or it may cause a breakdown in metabolism by combining with a specific substrate or by competing with an essential cell metabolite for an enzyme or coenzyme. One break in the chain of metabolic reactions may rapidly give rise to others. Specific immune serum and sulphapyridine do not compete for the same receptor group in the pneumococcus and may therefore enhance one another. Parasites may be killed in the body without the aid of phagocytes but usually when a parasite has been damaged it is destroyed by the normal defence mechanism of the host. Indirect action produces such changes in their environment that parasites can no longer grow. Physical changes may prevent growth, the temperature or the pH reaction may be altered, the formation of immune bodies may be stimulated, or the character of the cells may be altered, as in the treatment of gonococcal vulvovaginitis in children with œstrin preparations. The highly specific action of certain drugs and the no less specific reactions of certain closely allied parasites can be explained by postulating that after adsorption of the compound at the parasite/solution interface the nature of the interference with the metabolism of the parasite depends on what groupings in the molecule of the compound come within the influence of other acceptor groups in the parasite: there is thus a multipoint action.

Prof. ALEXANDER FLEMING said that in 1929 he applied the name penicillin to an antibacterial substance of unknown constitution elaborated by *Penicillium notatum*. It is formed in ordinary bacteriological media or in a modified Czapek-Dox medium. The action is mainly bacteriostatic and shows a high degree of specificity. Pyogenic cocci, clostridia and some other bacteria are sensitive, while the coli-typhoid, hæmophilic chromogenic bacilli and others are insensitive. Pathogenic gram-negative cocci (gonococcus, meningococcus and *Micrococcus catarrhalis*) are sensitive while saprophytic varieties—e.g., *M. flavus*—are insensitive, thus differing from the sulphonamides. The action of penicillin is not interfered with by substances that inhibit sulphonamides—bacteria, bacterial extracts, pus fluids, tissue autolysates, peptones and *p*-aminobenzoic acid. Penicillin is non-toxic to leucocytes and animals but in low dilutions it affects the morphology of bacteria and interferes with division. Penicillin has been extracted in an impure form by Florey and his associates, and this extract is in blood many times more powerful as a bacteriostatic agent than the most powerful of the sulphonamides. In vivo, likewise, it has been shown at Oxford to have remarkable curative effects in experimental infections of animals and pyogenic infections in man. Since penicillin is apparently of a different constitution from the sulphonamides the isolation and synthesis of the pure active principle will open up a new chemotherapeutic field.

Prof. WARRINGTON YORKE, F.R.S., described the action of the aromatic diamides which were evolved by Ewins, after it had been shown that Synthalin acted on trypanosomes not by reducing the sugar but by direct toxic action. Some aromatic diamidines exhibited a remarkable trypanocidal activity. The most active were 4 : 4′-diamidinostilbene; 4 : 4′-diamidinodiphenoxypropane; and 4 : 4′-diamidinodiphenoxypentane. Cases of kala-azar have now been successfully treated with diamidinostilbene — Indians, children in the Mediterranean area, and patients with the Sudanese variety which was resistant to antimony. Babesia infections in dogs were cured by the stilbene and propane derivatives. Diamidinostilbene is active against *Trypanosoma congolense*, but replacing the hydrogen atoms of the ethylene group by methyl groups greatly increases the activity against this infection. The various diamidines, therefore, exhibit a considerable specificity of action. Study of the phenomenon of drug-resistance may throw light on the mode of action of drugs. Drug-resistance in trypanosomiasis has been extensively studied, but little is known of the phenomenon in other protozoal infections. Professor Yorke and his colleagues have recently demonstrated drug-resistance in *Babesia canis* infections of dogs and in *Plasmodium knowlesi* infections of *Macacus rhesus*.

Dr. FRANK HAWKING, discussing trypanocidal substances, said that from the phenomenon of drug-resistance four kinds of receptors on the trypanosome are recognised—for arsenicals, acriflavine &c.; for parafuchsin; for diamidine compounds; and for Bayer 205. Trypanocidal action comprises fixation of the drug, secondary chemical reactions inside the cell, and death. Only about the first process is much known; it occurs quickly in a few minutes and is reversible. With arsenical compounds, fixation apparently depends on the trivalent arsenic atom linked to a benzene ring. Most side-chains prevent fixation, but certain ones ($-NH_2$, $-OH$) prevent it for the animal cells but not for normal trypanosomes; it is compounds with these side-chains which have chemotherapeutic value. The receptors of resistant trypanosomes are modified so that they resemble those of the animal cells, and thereby therapeutic action is lost. Over a wide range, the amount of drug fixed is proportional to the concentration in the surrounding fluid; in the case of acriflavine the partition ratio—the concentration inside the trypanosome divided by the concentration outside—is 8000 for normal trypanosomes, 60 for resistant trypanosomes. Some fluorescent compounds—e.g. acriflavine and diamidinostilbene—are concentrated in the blepharoblast and cytoplasmic granules of the trypanosome. With Bayer 205 the mode of action is quite different. It is not directly trypanocidal in vitro, and, although it does seem to form some kind of direct combination with the trypanosomes, the amount which is taken up is quite small. There is some evidence that it has an opsonin-like action.

Sir HENRY DALE, P.R.S., emphasised the importance of having a theory of chemotherapeutic action. It was one of Paul Ehrlich's great contributions to the subject to produce a theory which, though it would probably not survive unmodified, gave a tremendous stimulus to research. His speculations sometimes appeared more plausible than convincing; but in many cases they eventually proved to be well founded. An example was Ehrlich's explanation of the action of certain dyes on infection by trypanosomes as due to injury of the reproductive power of the trypanosomes, without affecting their other vital functions. At the time this suggestion seemed artificial and unconvincing, but when Dobell and Laidlaw found a method for growing *Entamœba histolytica* in permanent culture in vitro, it could be demonstrated that the action of emetine was just of this type. Another factor of chemotherapeutic activity which he believed to be important was the "factor of persistence." Effective chemotherapy is usually, if not always, a war of attrition rather than a Blitzkrieg. This seems to be why a quinquivalent arsenical on the one hand, or an arseno-compound on the other, is a better chemotherapeutic agent than the arsenoxide produced by reduction from the one or by oxidation from the other, although the arsenoxide is recognised as the directly parasiticidal agent. In the same way, sulphaguanidine seems to owe its effectiveness in bacterial dysentery to its poor solubility, enabling it to remain in solid form in the intestinal contents and to keep up a steady, low concentration in contact with the infected mucous membrane. Aromatic diamidines, the brilliant promise of which has been made clear by the results

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which Professor Yorke has reported, may similarly owe part of their superiority to their limited solubility. He suggested as problems whose solution might greatly accelerate advance in parts of the field of chemotherapy the discovery of a method of keeping trypanosomes alive and reproductive indefinitely in artificial culture, and of treating a strain of trypanosomes which had acquired a drug-resistance so as to restore its normal susceptibility.

Mr. D. D. WOODS, Ph.D., spoke of the interference of antibacterial agents and essential metabolites. This interference may be due to the formation of a compound between the antibacterial agent and the essential metabolite, as between mercury salts and -SH compounds, or to inhibition of an enzyme reaction involved in the synthesis or utilisation of an essential metabolite. An example of this is the competitive inhibition by sulphanilamide of an enzyme reaction involved in the further utilisation of *p*-aminobenzoic acid, this inhibition occurring by virtue of the chemical relationship of sulphanilamide and *p*-aminobenzoic acid. The latter has been isolated from natural sources and is a growth factor for *Clostridium acetobutyricum* and higher organisms. Working on this hypothesis, the following substances, all chemically related to a known essential metabolite (shown in parentheses), have been found to have some antibacterial activity—pyridine-3-sulphonic acid and amide (nicotinic acid and amide); aminosulphonic acids (analogous aminocarboxylic acid); sulphonic acid analogue of pantothenic acid (pantothenic acid); indole-3-acrylic acid (tryptophane); barbituric acid (uracil).

Mr. H. MCILWAIN, Ph.D., said that an organism which is deprived of the use of enzymes or metabolites by various types of interference is nutritionally more exacting than in its normal state. *Bacterium coli* and *Streptococcus hæmolyticus*, inhibited by acriflavine components, require for further growth two types of material not normally required. Type 1 is best replaced by nucleotides, type 2 by a concentrate of amino-acids, but partly by phenylalanine. In the presence of type 2 compounds, but not without, artificial hydrogen carriers are further active against inhibition of *Bact. coli*. Type 1 compounds form complex salts with acriflavine components. The inhibitors probably inactivate enzyme systems of which type 1 compounds are essential parts, of which type 2 compounds are substrates or products, and of which some can be replaced by the hydrogen carriers.

Mr. W. H. LINNELL, Ph.D., described the relationship between chemical constitution and bactericidal action in certain amino acridines. Among the isomeric diaminoacridines, 1-amino group causes complete loss of bactericidal activity and reduces toxicity; a 2-amino group increases activity and this is further enhanced by another amino group in the 2-, 3-, 4- (in the other ring), or 5-positions, accompanied by increased toxicity in the case of a second 2- substituent. When two 3-amino groups (= 3 : 7) are present, activity is moderate, but the 3 : 8 diaminoacridine (= 2 : 7) is as active as proflavine but less toxic. A 4-amino substituent confers small activity while position 5 is highly active but probably leads to increased toxicity. Albert has shown that similar differences in activity exist among the five isomeric monoamino acridines, their activity paralleling their strength as bases and their partition coefficients between oil and water. The corresponding acridones are inactive, as are certain amino derivatives of 5 : 10-dihydroacridine and of iminodihydroacridine, suggesting that the intact acridine molecule is necessary.

Mr. L. G. GOODWIN, B.Sc., said that the uncertain action of antimony in protozoal diseases, of which the resistance of Sudanese kala-azar to antimony is an example, is an added difficulty in investigating its mode of action. The active form of antimony may be the stibinoxide grouping, but while this is probable in trypanosome and schistosome injections it is unlikely in leishmaniasis where quinquivalent compounds are the most effective and massive dose therapy is successful. Excretion of antimony after doses of the quinquivalent compounds or of stibophen is much more rapid than with tartar emetic. There is some indirect evidence that the rapidly excreted fraction of the drug passes through the body unchanged. Both direct toxic action on parasites and stimulation of the hosts' defence mechanisms are produced by antimonials. Increased phagocytosis may be of primary importance in leishmaniasis, though histological work on the spleens of infected hamsters injected with a quinquivalent antimony compound suggests some degree of direct action.

Mr. E. CHAIN, Ph.D., described the chemical and physical properties of penicillin in relation to its bacteriostatic action. It is a strong acid with two or a multiple of two acid groups. A purified barium salt gives a carbon content of 55% and an H content of 6·3%; only C, H and O are present in the molecule. Methoxyl groups cannot be detected but two hydroxyl groups are present. The dried Ba salt of penicillin keeps indefinitely and in watery solution is most stable between pH 5 and 7. With heavy metals, except ferric iron, it forms water-soluble salts. The antibacterial action is lost by oxidation with hydrogen peroxide and potassium permanganate.

Mr. E. P. ABRAHAM, Ph.D., said that the instability of penicillin necessitated three methods of purification dependent on distribution between solvents, adsorption and reduction. The crude barium salt obtained from an amyl-acetate extract of the medium has an activity of 15-25 units per mg. Distribution between water and ether at pH 2 and pH 6, adsorption of impurities by charcoal, and chromatographic analysis on alumina yield a light yellow barium salt with an activity of about 150 units per mg. On reduction of this material in neutral solution with aluminium-mercury couple the remaining pigment is adsorbed by alumina. The white barium salt obtained from the supernatant has an activity of 240 units per mg. It completely inhibits staphylococcus in a dilution of 1 in 5,000,000, and partially in a dilution of 1 in 16,000,000.

Mr. F. R. BRADBURY, Ph.D., has studied the behaviour of sulphanilamide, *p*-aminobenzoic acid and chemically related compounds, aniline and sodium benzenesulphonate, at the surface of *Bact. coli* by electrokinetic methods. The shapes of the curves relating variation of mobility with time of contact for sulphanilamide and *p*-aminobenzoic acid are quite different from those of the curves for aniline and sodium benzenesulphonate. The curves for sulphanilamide and *p*-aminobenzoic acid are similar, suggesting that the two compounds behave in a like manner at the bacterial surface.

Prof. A. ST. G. HUGGETT said that dyes such as chlorazol sky blue FPS (Chicago blue) and chlorazol-fast pink BKS are excellent anticoagulants. Structurally they resemble afridol violet from which Bayer 205 is derived; they have a trypanocidal action while Bayer 205 has an anticoagulant action. The dyes act at two points in the clotting mechanism, as antikinase and as antithrombin. Their antienzyme action in blood-clotting may have an analogy to their mechanism as trypanocidal agents.

SOCIETY OF M.O.H.'s

AT a meeting of the Fever Hospital Medical Service Group of this society on Nov. 14, a discussion on

Fever Hospitals and Pathological Services in Post-war Planning

was opened by Dr. H. STANLEY BANKS (L.C.C.) who thought that fever hospitals as well as general hospitals should be regionalised. Modern fever-hospital work requires the equipment of a general hospital—e.g., first-class laboratory service, X-ray and physiotherapy departments and operating-theatre. Wards for the general sick can be a success in fever hospitals. In future, fever units and general units could be combined under one administration. Over 80% of fever hospitals outside London have less than 50 beds, and about 55% less than 20 beds. Many of these small hospitals should be closed or linked up with others. It is important to determine the best method of administration of a regional authority. The usual local-authority method by which a chief medical officer appointed by the authority is responsible for both the management and medical direction inevitably leads to a centralised bureaucracy. This may be effective for a time by improving the backward units but soon produces atrophy at the periphery, and medical progress depends on initiative at the periphery as well as support from the

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centre. There should be a proper balance of power and responsibility between the two, which might be achieved by leaving medical direction to local and regional medical committees of senior staff. The regional committee could make itself responsible for conveying medical advice and direction to the authority, by the use of a whole-time staff if necessary. Some such scheme of decentralisation of medical direction is essential to preserve the vitality of a hospital service.

Dr. L. J. M. LAURENT (L.C.C.) suggested that voluntary hospitals, owing to increasing grants from the state, are bound to come under state control. They enjoy a semi-independence which helps medical progress but does not further mutual support. Municipal hospitals under the management of local authorities have become as efficient as voluntary hospitals but labour under a highly centralised administration. Any future scheme of hospital planning should avoid the disadvantages of both and the perpetuation of a dual system of hospitals. The creation of a regional authority to control both kinds as equal partners would be a step in the right direction. Modern fever hospitals approximate so much to general hospitals that they should come under the same authority. Small fever hospitals should be replaced by larger units serving adjacent areas. The large fever hospitals as a result of the war are now treating cases of tuberculosis, chronic sick and senile patients, pneumonias, skin disorders and casualties, besides cases of notifiable disease. After the war a diminution of infectious diseases is to be expected, and the beds left vacant could continue to be used for these cases. To meet the needs of medical education fever hospitals should be allowed to receive patients from larger areas than at present. An infectious-diseases block attached to a general hospital would benefit both sections.

Dr. A. A. CUNNINGHAM (L.C.C.) thought that a good deal of the open ward accommodation in large fever hospitals could be made available for general medical and surgical cases. This practice was begun in London before the war. The head of a hospital should be a medical superintendent, not a layman, but there should be well-paid posts for good clinicians. Teaching hospitals should have a voice in the appointment of those who train students in infectious diseases.

Dr. J. E. MCCARTNEY (L.C.C.) said that a pathological service must provide for all classes, not only for hospitals but also for medical practitioners and public-health work. As the laboratory must be near the patient, the technical work should be decentralised as much as possible, but supplies, equipment, and conditions of service should be standardised as far as possible. The country would be divided into regions, and the regions into groups each under a pathologist working in the main laboratory of the group, which would be similar to a L.C.C. group laboratory. According to need there would be sub-group laboratories staffed by assistant pathologists, or, where work was insufficient, a technician would be employed. No separate public-health laboratories would be provided but the medical officer of health would be in touch with the group pathologist in his area who would organise all pathological work; a mobile laboratory staffed by personnel from less busy parts of the region would be sent to any epidemic. The work of the region would be coördinated by a regional pathologist who should not be a whole-time administrator but attached to or in charge of a laboratory, and his work would be mainly technical. All regions would be coördinated by a director of pathological services. Technical and administrative sides would be run by a committee consisting of regional pathologists and administrative staff—e.g., for personnel, finance, buildings. London would be organised on similar lines to suit its requirements. There should be full coöperation with university teaching departments, many of which would be the main regional laboratories. Research would also be coördinated. The organisation of supplies would be on the lines of the L.C.C. centralised system which supplies not only its own laboratories but also the Ministry of Health sector laboratories in London. The L.C.C. pathological service, now functioning as a regional laboratory service, might become the basis of a national one.

Dr. ROBERT CRUICKSHANK (L.C.C.) thought that the association of laboratory services with infectious diseases hospitals needs to be developed, for laboratory help is essential in the diagnosis, treatment and control of most infectious diseases. Besides, a laboratory on the spot helps to maintain the standard of work in the hospital and encourages coördinated investigation and research. To do this the laboratory staff must not be overburdened with routine work, and the intellectual calibre of the personnel should be high. In the past, the clinical pathologist has often been regarded as inferior to his colleagues in the teaching and research departments, but with full-time adequately paid posts and encouragement of research, clinical pathology should be able to attract the best brains. The laboratory doing the bacteriological work of the fever hospital should also do the public-health bacteriology of the surrounding area. Such an arrangement is specially desirable in London where the liaison between the borough M.O.H. and the local isolation hospital is not as close as it might be. Field epidemiology, at present rather neglected, would also be encouraged by a system of regional laboratories such as the L.C.C. had established in London.

Dr. R. A. O'BRIEN (Beckenham) was of the opinion that no scheme for the future of the pathological services need look further than the L.C.C. group system for a plan on which to build.

Dr. E. C. BENN (Leeds) agreed that hospital regionalisation is inevitable. Each part of the country has its own problems and one of the major obstacles to be overcome is local prejudice. Full pathological services should be available to every hospital, but small units attached to small hospitals are to be avoided in the interests of economy.

Dr. A. G. TROUP (Willesden) spoke of general hospitals he has visited in Austria and Czechoslovakia with successful fever sections. The admission of ordinary medical and surgical cases to isolation hospitals is safe from the cross-infection point of view and Dr. Troup described his experience of this at the Willesden Isolation Hospital. Fever hospitals must be considered in any scheme in order that all available beds can be used for the maximum benefit of the community. In London the sector system might form the basis on which to found the post-war scheme. The better and more modern fever hospitals should be enlarged and the others used for a different purpose or closed. The Local Government Act of 1929 and the Public Health Act of 1936 suggested this but no progress has been made owing to the absence of compulsory powers.

Dr. FRED GRUNDY (Luton) preferred to substitute for Dr. McCartney's "mobility of personnel" a flexibility of personnel, for pathologists should remain long enough in a laboratory to get to know the local doctors. No isolation hospital should have less than 200 beds, so that each should carry at least one resident medical officer. Local government areas should be amalgamated under existing legislation or rearranged. But the future of the treatment of infectious diseases will be found in the linkage of cubicle blocks and special wards with general hospitals, or, possibly, with children's hospitals. Planning should take into account the need for improvement in the training of nurses.

Dr. D. V. HAGUE (Yeovil rural district) thought that separate infectious disease hospitals are unnecessary. Greater efficiency would be found in a fever unit of a large general hospital, for there would be greater opportunities for consultation and treatment, better education of medical students in fevers, and all nurses would get fever and general training. With competent fever-trained staff the disadvantages are negligible. Some of the present isolation-hospital buildings might be used as children's hospitals where the school M.O. might act in a clinical capacity, to the benefit of the patients and the school M.O. himself, who has far too little experience of sick children. If regional control is adopted, there should be some local autonomy, and mechanism for the regular expression of opinion on local conditions to the regional board.

Dr. WILLIAM GUNN (L.C.C.) did not think that epidemic diseases will subside much after the war. Under a statutory organisation the smaller voluntary hospitals would no longer be run as nursing-homes for the benefit of the consultants. The best unit in a hospital system would be a large hospital centre with a minimum of 1000 beds and general and special depart-

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ments of all kinds. A workable scheme on these lines, the "Walton plan," has been worked out.

Dr. C. A. MCPHERSON (Chertsey, and Walton and Weybridge urban district) said that the lack of a pathological service is one of the chief disadvantages of a small isolation hospital. The provision of this by the E.M.S. has been of the greatest value. X-ray facilities are also needed perhaps as mobile regional units. In some provinces in France general hospitals successfully provide treatment for tuberculosis and infectious disease, and have health departments which administer the other public-health services.

Dr. R. W. TANNAHILL (Waltham joint hospital board) regarded 250,000 as a population for which it is economic to provide an infectious-diseases hospital, and where necessary districts should be combined. Such a combined authority could support a full-time resident medical officer. The infectious-diseases hospital should be able to admit all infectious diseases in the area, whether notifiable or not, and this is possible only in the larger units. Many small hospitals admit only scarlet fever and diphtheria. Infectious wards in general hospitals have been in operation in other parts of the world for many years. It is an advantage to have the services of the consultant staff and of the pathological department available for infectious cases, and the resident medical and nursing staffs learn much from a spell of duty in the infectious wards. Existing fever hospitals could be attached to a large general hospital for these services.

Reviews of Books

Integration of the Personality

C. G. JUNG. London: Kegan Paul, Trench, Trubner and Co. Pp. 313. 15*s*.

Dr. Jung is well read in esoteric subjects, but his learning seems too heavy for him in this work. The book is overloaded with quotations and references, and unless its readers have a liking for statements in which abstruse semantics are blended with a subfusc mysticism they will not penetrate Dr. Jung's meaning. The six lectures composing the book are concerned with individuation, by which is meant "the psychological process that makes of a human being an individual." The earliest section deals with the animus and the anima, familiar in Dr. Jung's previous writings as primordial figures, archetypes located in the collective unconscious. A case is described, with an illuminating account of how Dr. Jung deals with the symbolic material in patients' drawings; and in a later chapter the dreams of a patient are interpreted on rather gnostic lines. The psychology of alchemy is examined at length in chapter 5, and the final chapter contains some opinions about the modern need for a leader who has decided to follow the law "that comes from within. . . . He has been called away from the all-powerful, all-oppressing psychic life that is his own and his people's affliction. . . . With the very decision to put his own way above all other ways he has already in large part fulfilled his liberating vocation. He has cancelled the validity of all other ways for himself —he has placed his law above all conventions." Dr. Jung delivered the lecture in which this passage occurs in 1932, but he can hardly have foreseen how canonical this bit of Führer-doctrine would soon become; it was, however, well placed after the chapter on alchemy, since the futile arm of alchemy was to transmute dross.

It Passed Too Quickly

Air Vice-Marshal Sir DAVID MUNRO, M.A., LL.D. St. And., M.B. Edin. London: Routledge. Pp. 304. 15*s*.

THIS work, suffused with personality, is the story of a small boy in an Eton suit arriving at St. Andrews University in a cab from Leuchars at the age of fourteen as an undergrad, and returning nearly fifty years later to the same station with an escort of planes, to be drawn from thence by students in triumph in an open carriage after his election as rector of his old university. What happened to him in the interval is displayed with staccato zest. He left St. Andrews with his M.A. degree to finish his medical career in Edinburgh, working under Caird, R. J. A. Berry, Schäfer, Greenfield, Littlejohn, Byrom Bramwell—what a galaxy. Then came entry into the I.M.S. at the time of the South African War, and work at Netley under Sir Almroth Wright and Leishman. Then India, to one frontier post after another in quick succession, a period which allows of rapid little vignettes of officers, tribesmen, patients, hospitals, marches with the Guides, the Delhi Durbar and Curzon, Kitchener, pig-sticking and big-game hunting. After three or four years on the military side came marriage and a transfer to the "civil" and life in Calcutta The I.M.S. was then in its heyday: "We were Harley Street and the universities in one. Museums, jails, botanical gardens, marine surveyships, even the Mint had I.M.S. officers, and we held all the teaching appointments in the medical schools." The author had his fair share of these responsibilities; he thought he was in civil employ for life.

And then unexpectedly came the war of 1914–18, and recall to service again: home to England, hospital ships in the channel for Indian wounded, idle days in the Isle of Wight, a sudden order East again, Basra, "Mespot"—the now almost forgotten story of the medical muddle—Gertrude Bell, Sir William Willcox, Sir George McMunn, Sir Matthew Fell. Again change: Egypt, Allenby, lines of communication, the great advance, the armistice. Then home again to England, and transfer from the I.M.S. to the newly formed Air Force Medical Service of which a few years later he was to become director-general. After that, secretary to the Industrial Health Research Board, where the tale ends. Among the great variety of interest, the many wise and witty comments on life in general, on medical education, and on sport, especially hunting of which the author is a devotee, the reader must browse for himself. A full life is recorded here, a stimulus to all who read it.

Contraception

(5th ed.) MARIE CARMICHAEL STOPES, D.Sc. Lond. London: Putnam and Co. Pp. 459. 15*s*.

THIS book reflects the personal views and character of a pioneer. It contains information which must have taken many years to collect, but is not an unbiased statement of the present state of contraceptive technique. Why Dr. Stopes elected to end her history of the birth control movement with a party at the Ritz celebrating the tenth birthday of the original clinic is obscure; a lot has happened since 1931. The birth of Dr. Abraham Stone's admirable *Journal of Contraception* (now *Human Fertility*), the work of the Birth Control Investigation Committee and the Family Planning Association and its medical subcommittee are unnoticed; the references to modern work on spermicides are sketchy; and no mention is made of Dr. J. R. Baker's recent work on them, of Dr. H. Carleton's study of local effects of various chemicals, or of the clinical and laboratory work done in America.

Essentials of Dermatology

NORMAN TOBIAS, M.D., senior instructor in dermatology, St. Louis University. London: J. B. Lippincott Company. Pp. 497. 28*s*.

MORE useful information is crammed into this small book than there is in textbooks many times its size—hardly any redundant matter and plenty of good photographs which may account for the rather high price. Here and there the brevity of the discussion leads to some confusion, as when under lupus erythematosus it is stated that gold is a useful drug without mentioning what type of gold should be used or how it should be administered. Similarly under secondary exfoliative dermatitis, except for the illustration, no mention is made of dermatitis due to N.A.B. or gold salts, surely two of the most important causes of this disease. An important omission is that streptococcal tonsillitis may be and often is the cause of erythema scarlatiniforme. Not all agree that granuloma annulare responds to treatment with Fowler's solution or that 606 is better than 914 in the treatment of syphilis. Dermatologists in this country are satisfied that in the treatment of ringworm of the scalp X-ray epilation is the treatment of choice and not, as Dr. Tobias suggests, to be reserved for intractable cases. The chapter on eczema, is one of the best expositions on the subject to date, but is it for the benefit of the patient or doctor that subjects of intractable atopic eczema are to be advised to move to another part of the country?

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THE LANCET
LONDON: SATURDAY, DECEMBER 20, 1941

COLLECTION OF INVASION CASUALTIES

AUTHORITIES have been urged to coöperate with each other so that the combined machine for the collection of casualties shall work as smoothly as possible if we are invaded. There are three main schemes in operation, and each of them possesses aid-posts of different capacities, all of which, together with all the ambulances, are to be available for both civilian and military casualties. An attempt is now being made to weld these services into one and to arrange their aid-posts on a network plan, which shall allow the least specialised to be ranged around those of more complexity, and these again around the general hospitals.

The first or lowest class of aid-post may be either a detachment aid-post of the R.A.M.C. (consisting of one or two first-aid men and a small satchel of dressings), a civilian first-aid point, a Home Guard casualty collecting post, or a wholly unofficial private house or factory which may chance to have a certain amount of equipment. Walking casualties are expected to find their way to such points as these, and Home Guard stretcher bearers will also be expected to carry their charges there, but civilian stretcher cases are to be taken by ambulance direct from the place at which they are injured to some post in the second or third class. The posts of this first class will not have a doctor in regular attendance. Between the first and second class of posts there comes an intermediate class which includes advanced dressing stations of the R.A.M.C., regimental aid-posts of the Home Guard and up-graded points of the civil services. The precise function of these units is likely to vary with the needs of the moment. Their equipment is simple and their staff extremely small. The second main class of aid-post comprises main dressing stations of the R.A.M.C., first-aid posts (mobile or fixed) of the civil services, and some of the smaller hospitals. These are intended for the treatment and temporary accommodation of cases which do not need specialist surgical treatment but are yet so severely injured as to need inpatient care or to be sent home to bed by ambulance. These posts will also deal with walking cases from their own vicinity or cases brought in from a distance without stopping at any lesser post. The third and last form of medical aid is to be given at casualty clearing posts of the R.A.M.C. or at fully equipped military or civilian hospitals. In so far as these may prove to be too near to the battle zone for reasonable safety, their patients will be cleared as soon as possible after operation by Green Line ambulance or hospital train to suitable refuges in remoter areas.

These three classes include most but not all of the recognised posts. The normal course of a stretcher case from the time of wounding until he reaches hospital will vary according to whether he follows the R.A.M.C., the Home Guard or the civilian route of evacuation. The fact that he follows any particular route does not imply that he is either a soldier or a civilian; each may follow any of three routes.

The wounded soldier or the wounded civilian in a military area will be picked up on the battlefield by regimental stretcher bearers and carried to the nearest post of class I. In the case of the Army this will usually be an advanced dressing station or a regimental aid-post. Here he will be looked after until it is possible to load him on an ambulance. The ambulance will convey him, according to his needs, to a post of class 2, direct to a hospital, or perhaps an ambulance train for further transport away from the scene of action. Having received the best attention possible at the second class post he will if necessary be sent on to hospital. This will either be some special hospital—say for fractures or head cases—or a general hospital.

2. The Home Guard stretcher case will be picked up on the battlefield by H.G. stretcher bearers and carried to any post of class 1. If this is a H.G. casualty collecting post, the Home Guard must then establish contact with the civilian control centre and look after the wounded until ambulances arrive to take them away. Home Guard responsibility will then cease and casualties will follow the civilian route of evacuation.

3. The wounded civilian will get into touch with the air-raid warden or the police who will in turn get into touch with the control centre. This will send out (if possible) both a first-aid party and an ambulance or ambulances. The wounded will then be taken to a post of the second class, to one of the intermediate class, or to a hospital according to the needs of the case as assessed by the first-aid party. If a number of civilian casualties occur at one spot the control centre may send out a mobile first-aid post with orders to open up in some convenient building and deal with the cases on the spot.

These are the main types of post and the main lines of evacuation at present planned, but their harmonious coördination is hampered by several factors. Many people suppose that it will not be possible to put ambulances on the road in invaded areas for periods which may be as long as a week. Some posts—for example the up-graded points now being established—are required to have accommodation and rations for a week while others, notably the Home Guard posts and ordinary civilian points, are established on the understanding that ambulances will always be available and that they will not be called on to retain patients. Until it is generally agreed whether it is wise to depend on immediate clearance by ambulance no satisfactory coöperation is possible. If it should prove that ambulances are delayed for periods ranging from 24 hours to a week all posts of the first class would have to provide hasty and probably unsatisfactory accommodation, dressings and food. In a settled and well-populated country it ought not to be necessary to depend on last minute improvisations to this extent. A second obstacle to coöperation is the present distribution of medical man-power. As at present arranged, the civilian services claim to have the first call on all medical men, including those of the Home Guard but not those of the R.A.M.C., even if temporarily idle. This claim includes the right to keep medical officers at duty points—such as a garage housing a mobile ambulance—even if there is no work for them to do and even if, as Home Guard or civilian doctors, there may be great need for them elsewhere. So long as one Service makes a claim of this sort there is bound to be a serious wastage of medical man-power and this wastage we can ill afford. What is needed is some form of clearing house for medical men under the control of a commission representing all three Services, which shall get to work before the emergency comes and continue to operate in time of invasion. A third difficulty arises because there is no agreement about decentralisation and dispersal of

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medical equipment and first-aid workers. It must first be agreed, of course, whether circumstances will or will not compel the dispersal of casualties and whether concentration of casualties in defended towns and other danger spots should be permitted. There are bound to be differences of opinion and no official decision will command universal approval, but these points should at least be discussed and a line of action should be agreed on by the heads of all three Services. Otherwise the Services themselves can never coöperate in a way to command the confidence of the public.

THE MAN IN THE IRON LUNG

THE Drinker type of respirator, so beloved of public fancy, has only a limited use in this country where widespread epidemics of anterior poliomyelitis are rare. There are patients, however, whose lives depend on its use, and their management calls for highly skilled medical supervision and nursing. In America such cases are more common. SCHMITT and SELDON,[1] of the Mayo Clinic, discussing practical points in management, say that negative pressure should not exceed 20 cm. of water, and that positive pressure is needed only when the patient is being taught to cough. Negative pressure should be increased to 25–30 cm. of water for a few minutes every four hours, to keep the costochondral joints from getting stiff. The respiratory rate is kept at 18–20 a minute, and rate and pressure should be the lowest possible to keep the patient comfortable and of a good colour. His head is kept lower than his feet, making an angle of some 20° with the horizontal, and mucus and secretion draining into the throat as a result of this posture are aspirated by gentle suction. Portholes in the respirator make it possible for ordinary nursing care to be given without removing the patient, but for any complicated measure it may be necessary to take him out. If the respiratory muscles are not completely paralysed he may be able to breathe without mechanical aid for a few minutes; otherwise if the machine is opened respiration must be maintained in some other way, and SCHMITT and SELDON have devised a simple technique of giving oxygen through a face mask and bag. When the machine is stopped, or open, the mask is applied, and the bag is squeezed rhythmically 18–20 times per minute. In this way the patient is able to remain out of the machine long enough for essential nursing and medical attention to be carried out thoroughly.

Between 400 and 500 patients suffering from poliomyelitis were treated in respirators in the United States last year. Two-thirds of them had bulbar paralysis with pharyngeal paralysis, and two-thirds of these died. WILSON,[2] SCHMITT and SELDON agree with the English findings that better results may be obtained in bulbar paralysis from measures directed to maintaining the patency of the air-passages than from treatment in the respirator. WILSON mentions the use of tracheotomy in selected cases. He says that the respirator is clearly indicated only when the respiratory difficulty is due to intercostal or diaphragmatic paralysis and that a third of the 400–500 cases fell into that category, of which less than 20% died. Although it is sometimes questioned whether the use of the respirator is justified for patients who, if they survive, may be so severely paralysed that their lives will be of little value to themselves or others WILSON points out that at the time when the use of the respirator must be begun it is impossible to estimate the future degree of paralysis and thus every patient should be given his chance of survival and recovery. He emphasises the importance of instituting treatment in the respirator early if there is evidence of weakness of the intercostal muscles and diaphragm, in the belief that the weakened muscles can be rested and protected by treatment in the respirator and so possibly less strain put on the damaged anterior-horn cells. He suggests that the patient should be examined for weakness of the neck and shoulder muscles, which is invariably associated with intercostal and diaphragmatic paralysis, and he believes that the respirator should be used long before cyanosis, dyspnœa and air-hunger appear. SCHMITT and SELDON give as the chief indications for placing the patient in the respirator: restlessness, monosyllabic speech, increased respiratory rate and a vital capacity of less than 250 c.cm. of air.

In America it is difficult to make the ideal early decision for treatment in the respirator because there are not enough machines, and there it is hoped that some cheap, readily portable and effective respirator, perhaps of the cuirass type, will be developed. The position is different in Britain where Lord NUFFIELD has ensured that respirators are available in almost every hospital.

1. Schmitt, G. F. and Seldon, T. H. *Proc. Mayo Clin.* 1941, **16**, 453.
2. Wilson, J. L. *J. Amer. med. Ass.* 1941, **117**, 278.

WHERE THE WARD ROUND RUBS

PATIENTS probably cared little enough for the attentions of medical students even before Martial, in the first century A.D., wrote:

> Languid I called on you, Symmachus, quickly you heard me,
> Quickly you came with a hundred raw students behind.
> They earnestly pawed me all over with hands like the arctic:
> I was free from the fever before, but now—by Apollo!
> I'm burning.

Certainly this restive spirit in the clinical material has not changed since. Repeated examinations are not the only harrying part of the business: the patient may be perturbed by other aspects of the ward round—by anticipation, by the conflicting opinions of his examiners, or by his own misinterpretation of some technical term which he is too frightened to ask about. Dr. JOHN ROMANO has investigated[1] 100 unselected patients at the Peter Bent Brigham Hospital before, during and after the Saturday morning teaching round and has shown some of the ways in which the patient may be unwittingly dismayed. On these rounds one or two patients from each of the four medical wards are presented to a group of 50–70 people, including members of the staff, visiting doctors, students and nurses. The patient's bed is placed in the centre of the ward, the history is given, the patient is questioned and examined, and finally his case is freely discussed. The occasion thus has an important publicity and the patient may have to wait for a period ranging from a few minutes to an hour for the ward round to reach him. The patients investigated were all prepared for the experience by the senior house-officer who told them, on the day before the round, that they were being shown to a large group of physicians because their cases presented difficulties which would be better understood and treated after general discussion. The personality of

1. *J. Amer. med. Ass.* Aug. 30, 1941, p. 664.

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the patient was then studied and the emotional significance of his illness was assessed as far as possible; just before the round his respiration, pulse-rate and blood-pressure were taken. During the presentation of his case he was watched for changes in facial expression, blushing, pallor, restlessness, laughter or crying. Between one and three hours afterwards he was interviewed again and his anxiety was judged; he was then asked to define medical terms used at the bedside. The patients were adults except for 4 girls between the ages of nine and twelve and 1 boy of thirteen. Their ailments included infections, deficiency diseases, metabolic disorders, neoplasms, degenerations and psychogenic illnesses. The preliminary examination showed that 29 men and 30 women had little, 9 men and 16 women much, anxiety associated with their illnesses; in 2 women the illness was predominantly neurotic; and there was confusion, or a variable degree of awareness, in 11 men and 3 women.

The demonstration produced no severe emotional trauma in any of the patients. Nearly all were grateful for the preliminary explanation. There was, of course, some anticipatory anxiety, which reached its peak when the group entered the ward and came to the bed, and then subsided; 24 patients, including both the neurotics, admitted to feeling uneasy and tense; 12 of these belonged to the group of 25 who were already anxious about their illness, and 7 to the group of 14 who were confused. Only the two neurotics showed significant changes in pulse and blood-pressure. Repetition of the history distressed 13, especially when this was the occasion for learning unfamiliar facts. One youth discovered for the first time that he had had fits during the course of his illness and was greatly disturbed; a woman disliked a reference to a previous attempt at suicide; a man was wounded by the description of his ill-fitting shoes as "second-hand." The physical examination only annoyed 7. Some were embarrassed by being made to undress before an audience, and others were troubled because attention became focused on aspects of the disease which—to them—had previously seemed trivial. Thus a boy with diabetes and nephrosis became anxious when his heart was scrupulously examined. "I haven't got heart disease, too, have I?" he asked. Group laughter worried nobody; usually the patients could share the joke and joined in. Of 69 patients who remained for discussion of their cases 11 would rather have been removed, most of them because they felt tired or hungry or were in pain. Of 31 patients who were removed 16 would have preferred to remain; so that on the whole curiosity outweighed discomfort. Divergent opinions in the group seem only to have impressed patients with the thoroughness with which cases were being studied; which belies the oft-told story of a patient who, having listened to the unanimous opinion of a group of dressers that his tumour was benign and the honorary's "I propose to operate at once," got out of bed and went home, remarking "No, you don't!"

Definitions of medical terms by patients showed how wide interpretation may be of the mark. Neoplasm, mitosis, metaplasia and metastasis fortunately had no meaning for any patient. Shock, stroke, and paralysis were used interchangeably. Neurotic was defined as "nuts" or "due to imagination," but "nervous breakdown" was accepted as a respectable consequence of overwork. "Degenerative" was interpreted as implying moral decay, and "prognosis" meant "no hope" for some. This section of the investigation has a special interest, reminding us how constantly we should be on guard against the use of terms which may spread not only alarm and despondency, but undue hope. Thus it is common experience that for most patients the word "progressive" means a disease which will get progressively better; that "Graves's disease" carries the most gloomy interpretation; and that many a mother has been convinced that she must face a breech delivery from the use of the term "occipito-posterior." On the whole, however, Dr. ROMANO has shown that though patients may grumble a bit they are not unduly upset by ward rounds; and that a little extra care and vigilance will serve to allay what anxiety such experiences produce.

Annotations

FEEDING THE MINER

SINCE attention was last drawn in these columns to the need for supplementing the rations of workers engaged in heavy industries, such as coal-mining, steps have been taken to make supplementary rations available to miners. The Ministry of Food has been anxious to secure that this supplementary food is in fact consumed by the miners themselves, and it has therefore been considered necessary to make the issue at the mines concerned. There are several possible methods of making an issue of this kind—by the provision of packets of food containing pies, meat patties, &c., which can be given to the miner at the pithead for consumption either underground or when he goes home, by the provision of hot meals at the surface on completion of the working shift, or by sending suitable hot food down to be consumed underground during the mid-shift break. Each of the first two methods has been adopted fairly widely, with what success it is not yet possible to say. The first can at best provide a better cold "piece," which is obviously not ideal, and it may well be easiest to provide a hot meal in a surface canteen at the collieries that have already been equipped with pithead baths through the activity of the Miners Welfare Commission. Mr. David Robertson, M.P., favours the third method—a hot meal underground in the middle of the miner's working spell. The difficulties of this must vary a great deal from colliery to colliery, but it should not be impossible to serve hot meals under these conditions at several points for comparatively small groups of men. Many hospitals use thermos-like containers capable of carrying ample food for twenty or thirty patients and keeping it at constant heat for a time amply sufficient to meet mining circumstances. It may be that any system of distributing food underground raises difficulties in relation to payment and so on, and that the only practicable solution may lie in sending down individual containers with one man's ration in each. Even that should not be impossible, with a little ingenuity on the part of the makers of containers. Experiments have been carried out at a Midlothian colliery which promise good results in this distribution of hot food underground and the men in that colliery are said to favour the method. Mr. Robertson lately demonstrated some containers to members of the House of Commons and it seems probable that this system will be tried out on a more extended scale. It will be interesting to see whether developments along these lines do anything to remedy the notoriously high incidence of gastritis among coalminers. Efforts of this sort can scarcely fail to improve the miner's lot and must in the long run contribute to efficiency and output.

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TRANSPORT OF CARBON DIOXIDE

Most of the carbon dioxide carried from the tissues to the lungs is in the form of bicarbonate in the blood plasma. The limiting factor of the rate of CO_2 absorption in the veins and evolution in the lung capillaries is the stage $CO_2 + H_2O \rightleftharpoons H_2CO_3$, because this reaction, being molecular and not ionic, proceeds comparatively slowly, so slowly that if it were unassisted only 1% of the CO_2 known to be given off in the lungs from the blood could be given off in the second or so that the blood takes to pass through the lung capillaries. The assistant is the enzyme "carbonic anhydrase" which catalyses the reaction so that it proceeds at a proper rate. Oddly enough carbonic anhydrase is chiefly found not in the plasma but in the red blood-cells, so that evolution of the CO_2 in the lungs involves a complicated series of reactions.

The CO_2 is derived from H_2CO_3, carbonic anhydrase assisting the reaction, within the red cells; the H_2CO_3 comes from the potassium bicarbonate in the cells, which reacts with hæmoglobin, $KHCO_3 + H.Hb \rightarrow K.Hb + H_2CO_3$; the potassium bicarbonate of the cells is derived from sodium bicarbonate of the plasma by the exchange of Cl^- ions.

$$NaHCO_3 + Cl^- \rightarrow NaCl + (HCO_3)^- \text{ in the plasma}$$
$$(HCO_3)^- + KCl \rightarrow KHCO_3 + Cl^- \text{ in the cells.}$$

This interchange, familiar as the "chloride shift," occurs because the cell envelope is permeable to anions—Cl^-, $(HCO_3)^-$—but not to kations—Na^+, K^+. The net result is that CO_2 is given off and the plasma bicarbonate is reduced, and it is the activity of carbonic anhydrase that governs the final velocity of the reaction. The original work on carbonic anhydrase involved the destruction of the red cells by laking because standard manometric and colorimetric methods could not detect the activity of the enzyme in the intact red cells. Keilin and Mann,[1] by using a spectroscopic method, have now been able to show carbonic anhydrase at work within the intact red cell. They utilised the fact that hæmoglobin can be oxidised to methæmoglobin while the red cells remain intact. Methæmoglobin can act as an indicator since it changes its colour and its absorption spectrum when the acid form changes to the alkaline form between pH 6·5 and 9·5. Acid methæmoglobin can be changed to the alkaline form by adding carbonate or alkaline phosphate to a red-cell suspension or vice versa by adding CO_2 or acid phosphate. By using a special spectroscopic microscope eyepiece and matching the spectrum of the reaction chamber with the spectrum obtained by illuminating a movable wedge-chamber containing standard solutions of acid and alkaline methæmoglobin, they were able to estimate the amount of acid or alkaline methæmoglobin formed at regular time intervals, and so obtain a graph showing the velocity of their formation. When carbonate was added to a suspension of red cells containing acid methæmoglobin, 50% was changed to the alkaline form in 34 seconds. From what is known about CO_2 transport and its relation to changing alkalinity of the plasma, it was expected that carbonic anhydrase was also the limiting factor in these test reactions. Mann and Keilin[2] had previously shown that carbonic anhydrase is strongly inhibited by sulphanilamide, and this drug has the advantage of not reacting with methæmoglobin. If therefore sulphanilamide inhibited the test reactions, confirmatory evidence that carbonic anhydrase was the active enzyme responsible would be provided. This evidence was easily obtained, addition of sulphanilamide to the cell suspension greatly slowed the reaction; in a concentration of 5×10^{-4} M the 50% formation of alkaline from acid methæmoglobin took 210 seconds. In a similar but more complicated experiment, still with intact red cells, Keilin and Mann were also able to show that the reactions which induce the chloride shift are also delayed by sulphanilamide and are dependent on the activity of carbonic anhydrase.

We might thus expect that in anæmia, and possibly also in sulphanilamide poisoning, insufficiency or inhibition of carbonic anhydrase would lead to disturbance of CO_2 transport and also of oxygen transport since the two closely interact. There are two reasons why this does not happen. First, there is a large reserve of carbonic anhydrase, estimated by Lambie[3] as equal to ten times normal physiological requirements. He found that the anhydrase content of the blood could be reduced to a fifth of the normal without any signs of CO_2 retention appearing. The second fact is that there exists an alternative method of CO_2 transport which does not require acceleration by an enzyme or catalyst. If carbonic anhydrase is put right out of action the blood still takes up about 20% of the possible CO_2 instantaneously, the rest being taken up gradually as expected. Roughton[4] showed this was due to the formation of a carbamino-hæmoglobin compound according to the reaction.

$$Hb.NH_2 + CO_2 \rightleftharpoons Hb.NH.COOH.$$

This alternative is actually more important than is at first obvious because reduced hæmoglobin has been found to form this carbamino compound more readily than oxyhæmoglobin, so that Roughton estimates that 75% of the extra CO_2 taken up at constant CO_2 pressure when hæmoglobin is reduced is due to this reaction and only 25% is carried as bicarbonate. Thus thoroughly does nature provide for the protection of the vital CO_2 elimination and oxygen absorption under the most adverse circumstances.

1. Keilin, D. and Mann, T. *Nature, Lond.* Oct. 25, 1941, p. 493.
2. *Ibid*, 1940, **146**, 164.
3. Lambie, C. G. *Edinb. med. J.* 1938, **45**, 373.
4. Roughton, F. *Physiol. Rev.* 1935, **15**, 241.

VENEREAL DISEASE AND HOME VISITING

The inoculation of a sensitive social conscience into those who lack one is the aim of many workers in the field of social service. From time to time efforts have been made to visit defaulters from venereal-disease clinics in their homes and a recent successful experiment of this kind was reported by Dr. J. L. Burn in our columns.[5] A health visitor who acted as part-time nurse in the venereal disease clinic undertook the home interviews and confined her visits to defaulting women and children. She succeeded in getting more than a third of the 134 defaulters to attend regularly and another eighth to attend irregularly. There are difficulties in the way of extensive home visiting, however, though they are not necessarily insuperable. At a small clinic, where the consultant only attends on given days, it is relatively easy to arrange for the social worker to do her visiting in the intervals of his attendances, but in a larger clinic, where consultants are working daily, it is difficult to arrange for the social worker to be absent. And now that many more women patients are at work, much of the visiting must in any case be done after clinic hours. In small areas the V.D. social worker is also the health visitor for the antenatal and maternity and child-welfare departments. This was so in the area described by Dr. Burn, and the arrangement had the advantage that the patients and their neighbours knew her and did not identify her merely with the venereal-disease clinic. In larger areas it is unlikely that a social worker could undertake such a combination of duties and the visiting would have to be done by an almoner or nurse connected only with the clinic; the drawback here is that the patient's neighbours might recognise the visitor and draw their own conclusions. Expectant mothers are probably the easiest group to visit with success, since they are often at home and probably alone, except for any other children, during the greater

5. *Lancet*, Nov. 22, 1941, p. 655.

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part of the day. The anonymity of the visitor will mean much to patients, and methods of maintaining it should be well considered. Where children are suffering from congenital syphilis or have acquired vulvovaginitis it is rare for parents to refuse treatment for them; when they do the N.S.P.C.C. is willing and competent to deal with the situation. This voluntary body will also help when an infected mother refuses treatment for herself or wishes to have her child who has been cured of vulvovaginitis back at home with her. In large hospitals visiting may be difficult because the gathering ground is so great, and if many names and addresses turn out to be fictitious it may be deemed to waste too much time. There is evidence, however, that people are not giving false names and addresses so freely nowadays; and the provision of a little car for the visitor—anyhow in peace-time—should overcome difficulties of range. No doubt the personality of the doctor seen by the patient at the first attendance and the instruction then given verbally and by leaflet on the nature of the disease are important in keeping the defaulters-rate low. At the Lock Hospital much reliance is placed on this first interview, and letters only are sent out to recall defaulters. Only a very small percentage finally default under this system, and it must be remembered that some patients only come to a hospital to get an expert second opinion; when their suspicions are confirmed they return for treatment to the private doctor or the medical officer at the local clinic who first made the diagnosis. Yet no system can be regarded as perfect which allows even a few infected people to escape the net of treatment and spread the disease among their fellows.

IN DEFENCE OF A SEA DOG

WHAT distinguishes a pirate from an honest man? Chiefly, it seems, the lack of a licence to practise; but this is a distinction which ought to appeal to the medical profession. Drake was a pirate until Queen Elizabeth made him a captain in her Navy; after which he went on doing exactly what he had been doing before—but how much more respectably. Thomas Dover, whose memory Prof. J. A. Nixon tells us (p. 774) we have been slandering, was never a pirate at all. He was a member of a privateering expedition against Queen Anne's enemies in the South Seas. As we were then engaged in the war of the Spanish Succession, it is a pleasure to record that Dover's share in the sacking of the city of Guayaquil in Peru, and the taking of a Spanish prize, come under the heading of strict attention to duty. He was captain of the *Duke*, and later of the prize ship, but his colleagues, feeling no doubt that navigation was always a difficult art, would not let him sail them. They gave the responsibility to Alexander Selkirk, picked up from Juan Fernandez where he had been waiting for a lift for over four years and unconsciously providing the scenario for "Robinson Crusoe." After sacking the Peruvian city the English sailors slept in churches where they were much annoyed by the smell of the recently buried corpses of victims of a plague epidemic; and forty-eight hours afterwards, when aboard again, they all fell sick. On this occasion Dr. Dover can be exonerated less confidently from a suspicion of piracy, anyhow in a professional sense; he held no medical charge as Professor Nixon reminds us, but he took over conduct of the epidemic, directing the official surgeons to bleed the patients in both arms to the tune of 100 oz. apiece. After that he gave them dilute sulphuric acid to drink, and they all recovered except eight—no mean achievement on their part since the malady proved to be true plague. Dover, however, was never afflicted with the miserable virtue of moderation. He was a natural partisan of remedies, especially of metallic mercury which earned for him the name of the Quicksilver Doctor. Pirate or not—and we must of course agree with Professor Nixon and Sir William Osler that he was *not*—he was a fine full-blooded figure to have in our medical annals, from whom we, as his anæmic posterity, might welcome a transfusion. Such an enthusiast for phlebotomy should make an ungrudging donor.

PNEUMONIA TREATED AT HOME

THE value of chemotherapy in pneumonia is well authenticated from the records of patients treated in hospital, where diagnosis can be readily confirmed by X ray and pneumococcus typing, and where treatment can be controlled by laboratory tests and the patient's progress continuously watched. The proportion of pneumonias treated in hospital varies greatly in different areas, but the ease of administration of the sulphonamides and the ready response of the patient to these drugs will doubtless lead to a greater number of cases being treated at home. It is therefore important that the home-treatment of pneumonia should be both efficient and safe; in other words, that it should destroy the invading parasite without damaging the host. Some physicians are too heroic with this new weapon, forgetting that the sulphonamides are toxic substances, and unfortunate accidents occur—anuria from too high a concentration of the drug and insufficient fluid intake, or granulopenia from too persistent treatment. Others are over-cautious with the size of dose or stop treatment too soon so that the infection either smoulders on, perhaps with a pneumococcus now rendered drug-fast, or relapses after apparent cure. Treatment, with either sulphapyridine or sulphathiazole (the latter if available is as effective as sulphapyridine and less upsetting to the stomach), should aim at moderation. American workers[1] have found that there is no difference in the response of a pneumonic infection to blood-concentrations between 2 and 15 mg. per 100 c.cm. of these two sulphonamides, and they regard a total dosage of 25–30 g. as sufficient to control most pneumonias. The initial dose should be 2 g. (4 tablets) of sulphapyridine or 3 g. of sulphathiazole, followed by 1 g. every four hours for the first two days, and 1 g. every six hours for the next three days: with sulphathiazole particularly it is advisable to continue the four-hourly dosage day and night, for this drug is quickly excreted and therefore a steady blood-level is less easy to maintain. Here, sulphadiazine has a distinct advantage, for an effective blood-concentration of it can be maintained with smaller and less frequent doses.

Pneumococcus typing has never been popular in this country, and the new chemotherapy has pretty near sounded its death-knell. Yet pneumococcus typing not only gives valuable help in diagnosis—the isolation of a type I or II pneumococcus in an ill patient is practically diagnostic of lobar pneumonia and in most urban areas over half the lobar pneumonias are due to these two types—but it also helps considerably in prognosis and gives useful epidemiological data. That it can be carried out and prove informative in domiciliary practice has lately been demonstrated by McClure,[2] working in the central laboratory of the Provincial Department of Health of Ontario in close association with practitioners in the surrounding districts. Pneumococcus typing for the practitioners had been done in this laboratory since 1934, and of 1000 questionnaires sent out for information about the typed cases 647 were returned. In 495 cases pneumonia was present, and some form of chemotherapy, usually sulphapyridine, had been given to 386 of these. There were 21 deaths but in 2 of the fatal cases sulphanilamide had been given and in 6 others death was due to some other condition after the pneumonia had resolved. Excluding these 8 cases the fatality was 3·7% which may be compared with a rate of 9·5% in an earlier and similar series of 306 untreated cases; 80% of the deaths in the

1. Flippin, H. F., Reinhold, J. G. and Schwartz, L. *J. Amer. med. Ass.* 1941, **116**, 683.
2. McClure, W. B. *Canad. med. Ass. J.* July, 1941, p. 28.

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latter group, but only 30% in the drug-treated series, were under 60 years of age. The average amount of drug given was 18·4 g. per case, and McClure notes that not only was there a tendency to give too little drug but also to stop the drug too soon. As for the distribution of pneumococcus types in this series, it is noteworthy that only 83 out of 386 (21·5%) belonged to types I and II, a striking difference from the usual distribution in towns. Similar investigations could be organised in this country and would probably yield much interesting information.

INTRAMUSCULAR BLOOD IN CŒLIAC DISEASE

ARGUING that some disturbance of the internal secretions is the cause of cœliac disease, J. Wickström [1] of Helsingfors advocates its treatment by intramuscular injections of whole blood. The blood, from healthy adults, usually relatives of the patient, was injected into the gluteal region in doses of 15–20 c.cm. without any additions at intervals of 2–5 days for a series of 10–30 injections. During this treatment all other measures were suspended. An average mixed diet, suitable for the child's age, was given with generous milk and milk mixtures, porridge and so forth—in fact a diet which would usually be considered quite unsuitable for patients with cœliac disease. Several cases were treated at training hospitals for nurses with frequent changes of staff so that the good results obtained cannot be attributed to expert nursing care. Five children with different combinations of symptoms, but all undoubtedly examples of cœliac disease, were treated. No sudden change in symptoms occurred and to begin with the stools remained unchanged. But after a few injections the weight began to rise and this improvement continued steadily throughout the course of injections with a corresponding bettering of the appetite. After 2–3 months the weight had risen by between 1 and 4 kg. and the whole picture of the child had changed. The extra weight gave the limbs a better-proportioned appearance, the abdomen became less distended, muscle tone improved and the child's general behaviour, including temper, showed a striking change for the better. The stools tended to remain of the cœliac type for some time when normal stools began to appear, often alternating with cœliac stools. The blood-sugar curves, however, retained their low characteristics and a tendency to low blood-phosphorus was also unchanged. It is not claimed, therefore, that cœliac disease is cured by whole-blood injections, but it seems clear that the general condition is so much improved that other treatment is unnecessary. Wickström urges that this form of treatment is indicated when the general state of the child with cœliac disease is bad, with much wasting and loss of appetite. In fact it is during the worst phases of the disease that good results can be obtained by whole blood, and thus a big step towards final cure can be taken just when other therapeutic measures have failed. It might equally be argued that it is just at such a stage that a dramatic turn for the better often takes place without any special method of treatment, so that Wickström's modest claims will have to be confirmed.

INCREASE OF SCABIES

USING as his material the patients admitted to infectious diseases hospitals in five English cities during the past ten years, Kenneth Mellanby [2] deduces that the incidence of scabies from 1931 to 1937 was low and regular in distribution but in 1938 began to rise briskly and since that year the rise has accelerated. Roughly, before 1938 the incidence in fever patients was 3 per 1000, whereas by 1941 it had risen to 25 per 1000. The incidence varied in the five hospitals but the upward trend was the same in all. The rise started before the war, and though war conditions have probably helped the spread of the disease they cannot be proved to have done so. In one of the cities there had been much evacuation, in another there had been little, and "shelter life" was common in two but absent in a third. Yet the scabies graphs are nearly similar for all three. The cause of this rising epidemic of scabies is unknown. Mellanby suggests that the increase in dancing and cinema-going between 1930 and the outbreak of war may be in part responsible for it. Some will not accept his thesis that the incidence of scabies in the general population is similar to that in patients admitted to fever hospitals, but there can be little doubt that the trends will be much the same. Attention was called to the increase in scabies by many school medical officers in their 1938 reports, so the beginning of the epidemic can be dated.

1. *Nord. Med.* 1941, 12, 2889. 2. *Med. Offr*, Nov. 1, 1941, p. 141.

THORACIC SURGERY AT LEEDS

Mr. P. R. Allison has taken over the direction of a department of thoracic surgery at Leeds General Infirmary, relinquishing his appointment as hon. assistant surgeon. This teaching department is breaking new ground; the London Hospital and the Newcastle General Hospital have such units, and there are thoracic surgeons at many large hospitals, but Leeds claims to have the first thoracic department to be opened in a provincial teaching hospital. At present there are 10 surgical beds—5 for women and 5 for men—reserved for thoracic cases, which will form a war-time nucleus; later, when the hospital has its normal complement of beds, it is hoped to have more. Mr. Allison, to whose energy and foresight the department is largely due, will be assisted by an anæsthetist and a resident surgical officer.

SIDEROCYTES IN MAN

NOT long ago Grüneberg [1] found that granules of "free" iron could be detected by the prussian-blue test in the red blood-cells of mice suffering from an inherited disease typified by "flexed-tail and belly-spot." A few such cells also appeared in embryo and newly born normal mice and rats, and Grüneberg thought that they might also be found in man, if they were looked for. He now reports [2] that small percentages of siderocytes have been found in the blood of human fœtuses; the figures varied from 0·10 to 4·45%, and the amount of siderotic material was usually small. Grüneberg has tried to link up the presence of siderocytes with the change from megaloblastic to normoblastic erythropoiesis; this is unlikely since in man the change takes place at an early stage, being complete at about the 8th week whereas the age of the fœtuses whose blood was examined for siderocytes ranged from 33 to 40 weeks. The significance of the siderocytes is not known; present theory points to iron being transported in the plasma and combined with hæmoglobin in the bone-marrow, nor does it normally become "free" again until the hæmoglobin is liberated by the breakdown of the red cell. Their presence in normal embryos favours the suggestion that the free iron represents a hitherto unknown mode of hæmoglobin synthesis rather than a disturbed hæmoglobin metabolism.

Sir ALFRED WEBB-JOHNSON, P.R.C.S., has been elected a vice-president of the Middlesex Hospital. This is we believe the first time this honour has been conferred on a member of the active staff.

Dr. R. DAWSON RUDOLF, emeritus professor of therapeutics in the University of Toronto, died on Nov. 2 after a short illness. He was a graduate of Edinburgh University and was elected to the fellowship of the Royal College of Physicians of London in 1910. He renewed old associations on the European battlefield in 1917–18, taking special interest in trench fever, and his popular little book on the Medical Treatment of Disease had the critical outlook which marks the scientific observer.

1. See *Lancet*, Aug. 16, 1941, p. 195.
2. Grüneberg, H. *Nature*, London, Oct 18, 1941, p. 469.

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In England Now

A Running Commentary by Peripatetic Correspondents

FOR some of us it is hard not to feel sentimental about the-stately-homes-of-England-how-beautiful-they-stand, but we must reluctantly face the fact that they are already anachronisms, lovely vestiges of a more leisured age. If it seems unlikely that any more of them will arise in our time it is consoling to reflect that many of those still standing, their owners gone or roughly herded into a couple of unwanted attics, are proving useful for housing evacuated communities of one sort or another. Some of them are making excellent hospitals, convalescent homes or school buildings, even if the spectacle of Smith minor carving his initials on the old oak in the dining-hall causes their former masters to revolve unsteadily in the family vault. But the smaller places containing, let us say, a mere score of rooms have not been accustomed to harbouring a population of more than 20 all told (including the indoor staff), and when asked to accommodate perhaps two and a half times that number are apt to show their resentment in various ways. If the old squire, his family and retainers could make do well enough with three bathrooms and the same number of water-closets, the new school needs twice as many. The fact that these are constructed as fast as prevailing conditions permit does not solve the problem, for at this point the wells run dry, and the new bathrooms, to the eye imposing as they are, yield but few and scanty baths and in dry weather go on strike altogether, calling on the water-closets to follow suit. To be flushed with success may be for you or me just a pleasant experience; for a water-closet it is imperative. More wells have to be sunk, pumps and storage tanks installed before the old house is satisfied.

* * *

Our examination system is very fair, particularly in associating a newly appointed junior with a senior of experience to calibrate his sense of values and teach him that he must not be too exigent. He learns in time that a candidate may be an excellent practitioner in embryo although he has the most feeble capacity to describe, and exhibits a contempt for good English which is not the contempt bred of familiarity. A favourable impression is hardly created by the statement of a candidate that the patient is usually a male or a female; that such and such should be suspected until found absent; that the importance of this symptom is very important; that sleep should be attended to; that a fat person may cause confusion (apparently the intention was to inform the examiner that adiposity handicaps diagnosis); that the occurrence is unfortunate but of no significance. For such as these we have pity, but it is not the pity that is akin to love.

We soon abandon any expectation of encountering even the most elementary approach to style and construction, we accept the pabulum as containing all the necessary elements for our nutrition and do not trouble about the way it is cooked and served. Later we lose our wonder at the evidence of extreme illiteracy. I have collected the following from the paper of *one* candidate. (I am telling the truth, although I am certain that nobody will believe me.) I omit the errors which are practically universal such as preceed, accomodate, occurence, apetite, and others of that type, and confine myself to technical terms. Flem, Sharco joint, scabalæ, Pix disease, ematiated, caxecia, paracytic, syphillus, sight (site), stimulous, physic (physique), tacicardia, inflamertory, annorhexia, naushia, tabbacco, tick (tic), spescial, redenned, tosis, fibrilattion, ocluds (occludes). Now here is a queer thing. This candidate scored well over 60% in his paper and I am puzzled to explain his illiteracy. The obvious explanation is that his knowledge was acquired exclusively or mainly through his auditory channel and that he had never familiarised himself with the appearance of the words. Yet this plausible explanation is not satisfactory since the character of his answers supplied evidence of fairly extensive reading. One is inclined to suppose that spelling must be a special ability which comes to some people independently of phonetics or the extent of reading.

Not only may the paper be unreadable, it may be illegible. I sometimes marvel at my own patience when plodding wearily through almost completely undecipherable scrawl and even tolerating such carelessness as pinning pages out of order. In fact I am inclined to believe that illegibility may, like stammering, be a distinct advantage. The conscientious examiner, remembering that there may be much fertile matter in a muddy stream and unwilling to court a possible injustice, may prefer to presume the existence of something which might be identified through more trouble on his part. He would rather be a good-natured fool than, conscience-stricken, remain self-convicted of caddishness in penalising a physical defect or an attribute, albeit premature, traditionally regarded as a doctor's perquisite.

There appears to be some difference of opinion among the experts as to the best procedure to ensure the highest possible degree of professional efficiency and general culture, as a writer in the *Lancet* put it a few weeks ago in advancing his "plea for graduation at an earlier age." He deprecated the smattering of Greek and Latin and preferred the arrangements whereby clever boys of 16 already possessing a good grounding in biology are plunged in medias res. Yet actually on the same day I was confronted with a letter to the *Times* from the headmaster of a famous public school approbating my illustrious friend Professor Ryle and condemning early specialisation. (I was sorry to see his reference to the Regius Professor of "Physics" at Cambridge University but I am sure that this must have been a playful printer's variant and not a lapsus calami.) Other things, he reminds us, are expected of a doctor than technical knowledge—he is notably a man of science; he is a citizen holding a most responsible position in society, and as such his education should equip him with wide interests. In support comes a letter from a Scottish professor of anatomy whom we recall with affection when once upon a time he instructed our London youth until the call of his native town proved too strong against even our blandishments. He says that on returning to his own university he was relieved to find an absence of that degree of sheer illiteracy to which he had become painfully accustomed in examination papers in the south. This he attributed not to any inherent superiority in modern Scottish school education but to the proper proportion of the cultural subjects. Is it too late, he asks, to plead for the restoration of Latin as a compulsory entrance subject? An elementary knowledge of Latin or Greek is, he thinks, surely essential to the study of a profession whose terminology is almost entirely founded on those languages. He instanced the student who duly impressed by the derivation of the omo-hyoid muscle inquired "Well what about 'omo sapiens"? The story he assures us is painfully true, and recalling the examination papers I have recently corrected I have no difficulty in believing it.

* * *

It is good for the soul from time to time to re-examine principles, and try to find out how much foundation they have in fact. One may be led to strange conclusions. It has long been assumed that the bigger, chubbier and heavier the baby the better it is; that the child should be large and firm, with a "good" colour and good teeth; in fact the standard nutrition should be "A" in terms of the school medical examinations. This phrase nutrition A is vague. Nearly all the experiments done to demonstrate the desirability of this state of health have used children or young animals, and the rate of growth has been one of the main criteria. There is indeed some evidence that, with the improved diet which many children get, there has been an increase in average size (post or propter?).

If we ask the obstetrician whether a hard, large and well-calcified infant, or a small relatively rubbery infant makes the passage through the birth canal more easily we are told that the latter has an easier voyage. Does any mammal increase its food intake or drink the milk of other lactating animals during pregnancy? Is it not possibly an advantage to have a low blood-calcium near term, so that the uterus may be more sensitive to the stimulus to contract? Immediately after recovery from labour I imagine that most mammals increase their food intake, and so should women. Let them take their lime and phosphates, their ergosterol and carotene derivatives and their metallic salts in the puerperium, both as an aid to lactation and in anticipation of their next pregnancy.

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The strictest physical examination in Britain is probably that of prospective pilots in the Royal Air Force. I don't know what the average height and weight of these men is, but they seem to be below the average of the population both in stature and girth; yet they are physically one of the soundest groups of men in the world. Again, complete life tables show that age for age men of slightly less than average height and weight have a better expectation of life than men of greater stature and bulk. So is nutrition A really for the best? We might do better to produce a race of small wiry individuals.

* * *

The most beautiful thing in my garden at the present moment, to me at any rate, is the notched green leaf of *Barbarea præcox*, a winter cress which is going to provide me with salad for the next few months. It is, I am told, named after the holy Barbara of Nicomedia, patron saint of gunners, who has her day on December 4. The summer flowers flaunt their fading beauty, the chrysanths like hardy courtesans beckon me with waving grace and dye and subtle smell; I scorn the lot. With sense and season I seek more solid pleasures. The feeling of beauty in man (pace Professor Joad) is entirely utilitarian in origin, and in younger communities is demonstrably so now. It was only with the coming of the unnatural leisured class, unheld by primary needs, that it became elaborated. Colour that was meant to tell of ripeness became a creed; productive country a landscape; the beauty of woman and child, a lure to breeding, became in form and contour a fetish. Then this feeling was in many cases seized and refined by that strange phenomenon which I term "exclusive grouping." This you see best in the small boy whose gang has a secret sign, an adult form is Freemasonry. You see it in dress—that fellow who wears a made-up tie is beyond the limits of loathing. But above all you see it in the arts—he who cannot appreciate (as we do) the music of Bong is surely bestial, or the painting of Cong is a crass outsider, or the verse of Dong is a tick of the outer edge. Probably protective.

* * *

As a change from a life made up of sewers, forms and the horrors of the state let loose in medicine, I have become an amateur veterinary surgeon. Now I am seeing as many furry patients as their human counterparts, and it is strange how akin they are. Diana, a sleek lady spaniel in black satin, is as perpetually feminised as a certain sophisticated patient of peace-time practice. As soon as a male of her species enters, Diana exerts all the usual tricks of her sex, although her languorous eyes are sadly handicapped by a streaming conjunctivitis. Her human counterpart could also spare a glance of interest and appreciation even when in the most excruciating agony. Both had, of course, "seen many other doctors before I came to you, doctor." There the resemblance ends, for Diana's eyes cleared up at a surprising pace and she is glamorous again. The rapid onset and equally rapid cure among the animals surprises me. Porky, a spunky sealyham, was brought with a large corneal ulcer and corneal vascularisation. In other spheres I should have given a gloomy prognosis, but from a dull, torpid, butting-into-chairs quadruped, he was back to cat chasing and all other normal activities in two weeks. I nearly said "fit for parades, P.T., parashot, guards, and games," but the Service has not caught me as much as that—yet. A host of minor points crop up which puzzle me in this new vocation. How much sulphapyridine should be given to a flock of hens suffering from coccidiosis, and when and how should it be given? The vet said "Burn 'em all," but the large flock is surprisingly still in being after change of ground and thorough cleaning of the pens. I hope to succeed in this hen racket, as most traditional hen cures seem to go back to the tar-water and boiled-beetle era. Various fractures have also appeared, but my ambition to treat a bilateral fractured femur of the hind legs (how do the vets describe this?) in a dachshund by a roller skate strapped under the tummy did not meet with the approval either of the dog or the owner. A haughty spaniel scorned to use my plaster with walking iron applied to his fractured femur (off fore); now I know which fractures need plaster and which do better by natural methods. Another pitfall turned up when a little terrier pup was treated for worms on evidence which was later found to be an elastic band, one of many swallowed in a successful raid on the stationery drawer. The cure of some pets has baffled me, including our own pekinese, who seems to say a doctor's family is always badly treated. I believe a large beer bottle filled with hot water between the legs is helpful, although it makes him into a caricature of an incorrigible toper finishing off a last pint in bed. After all this I must write a memorandum on pets. The home treatment is confused and old wifish and needs drastic overhaul. I can see no reason why what works in the rest of the family should not work in them (if we can get the doses right).

Special Articles

SURPLUS OF IRISH DOCTORS

THE Eire papers have been discussing whether there are too many doctors in Ireland. It seems that no-one knows how many there are at present or how many there were in more normal times. Neither the Medical Register nor the Medical Directory gives much help, for many medical men practising outside of Ireland are in the habit of giving their home addresses for years after they have left the country, probably because the family home is their only permanent address. A few years ago it was calculated that, though there were between 2000 and 3000 practitioners in the Medical Register with Irish addresses, the number in actual practice in Eire itself was not more than 1500. The number now, including those in practice and those unemployed, is probably much greater than this. The reasons for the increase are not far to seek. For generations the Irish schools have educated large numbers of medical men for export. The output was far greater than the home demand. Young Irish graduates went to make their living in England and the British Dominions, where like Scottish graduates they were well received and were usually reasonably successful. This outflow is much diminished since the war began. It has not been easy to obtain a permit to cross the Irish Sea, though the authorities do not, as a rule, refuse permits to those who have obtained posts in Great Britain. They usually refuse permits, however, to those who merely wish to seek employment. In the past many young Irish doctors took resident posts in the British provincial hospitals, after attending a preliminary interview; they are now unable to obtain travel permits in order to attend such interviews, and so a high proportion of recent medical graduates are compelled to remain in the land of their birth. Moreover, a considerable number of young Irish medical men who were working in England have returned home, crowding further an already overcrowded market. No doubt some of these had always intended to return to Ireland when they had gained some experience in England.

Lay and professional correspondents in the Irish press have pointed out that the present supply of medical men is greater than the present demand, but few seem to have asked whether it is greater than the present need. They have been more concerned with the livelihood of those in the profession than with the needs of the country. Many of the essential public services are, in fact, much undermanned. This applies especially to the county hospital service and public-health services. Most of the county hospitals are new and well constructed but quite inadequately staffed. The personnel usually includes a single surgeon, who is a whole-time officer except for consulting work, an anæsthetist, and in some cases a visiting physician. The surgeon must also fill the rôles of gynæcologist, radiologist and pathologist. No specialist help is provided except for the occasional visits of an ophthalmologist in some cases. However able the surgeons may be—and they are good all-round surgeons—they have no opportunity of doing first-class work.

In the local health services a county medical officer of health and a county tuberculosis officer are to be found in each county. The county M.O.H. has to be school medical officer in addition; this school work has been undertaken with great zeal, but in few counties has the M.O.H. had time to examine each child more than once during its school life. Without more assistance this service—which should be one of the most repaying—must continue to fall short of what is possible. The poor-law dispensary service is probably adequately staffed in the

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country districts, but is grossly undermanned in the cities; much of its work is undertaken by the outpatient departments of the voluntary hospitals, which are thereby diverted from their proper task of providing consultant services. The country needs an increase of the personnel of the public services by at least half as much again, but at the moment the central and local authorities are unable or unwilling to provide the required funds. Yet until the public services are developed there should be no talk of too many doctors.

Some medical teachers maintain that teaching is hampered by the large numbers[1] in the classes, and especially in the clinical classes. This difficulty, if and where it exists, seems to arise from faulty organisation of the clinical teaching, which in the Dublin hospitals is done by seniors, who, as examiners, naturally attract a large number of students. If they shared more of their work with their juniors, the size of classes would become more manageable.

It would be hard to break the tradition of the Irish schools in educating more doctors than the country can provide work for, even if it were wise to do so. Many think that the country gains prestige from the quality of the doctors who leave it to work in other lands. Were the schools to limit drastically the number of students, many would still choose the wider field for their future careers and Eire would be inadequately supplied. But Irish emigrants—whether professional men or manual labourers—are not a complete loss to their country. Many of them send home help to their parents and relations which more than repays them for the expense of their education.

THE FORTIFICATION OF FOOD

ON Dec. 3, in the rooms of the Chemical Society at Burlington House, a successful joint meeting of two societies was held to hear papers on the Fortification (Enrichment) of Human Foods by the Addition of Specific Nutrients. The chair was taken in the morning by Mr. E. B. ANDERSON, chairman of the Food Group of the Society of Chemical Industry, and in the afternoon by Mr. E. B. HUGHES, D.Sc., president of the Society of Public Analysts. Mr. A. L. BACHARACH, F.I.C., who discussed the principles of food fortification, said he used the terms "fortification" and "enrichment" synonymously, although Mr. D. W. Kent-Jones, F.I.C., and Mr. A. J. Amos, F.I.C., who read the second paper on the technology of fortification, suggested applying "fortification" to procedures adopted to increase the amount of a nutrient present in a processed or manufactured food to the level present before such treatments, and "enrichment" to the addition of further nutrients over and above those normally present in the untreated food. After considering the standard examples of food fortification—the iodisation of table-salt, the addition of vitamins A and D to margarine, and the Government's proposals for fortifying white bread (from 75% extraction of flour) with aneurin and calcium carbonate—Mr. Bacharach put forward some general principles which should govern the fortification of all foods. He insisted that there was no difference between "natural" and synthetic vitamins, that the object of food fortification was, in general, not restorative, that is to say, was not made primarily to restore to a food something taken from it by refining process, and further, that no heed should be given to the arguments that a particular addition to a food was undesirable because the added nutrient was not "natural" to a food. Rather, he argued, fortification must be considered solely in relation to the proven need of a particular population for a given nutrient, and to the suitability of the food to which it was proposed to add the nutrient as a fortifying agent. Questions of stability, price and palatability must all be taken into account. All the resources of organic chemistry and chemical engineering, as expressed in the manufacture on a large scale of essential nutrients, should be mobilised to make good such specific dietary deficiencies as could be prevented by substances whose commercial production could be economically undertaken.

1. The number of students attending courses in medicine and dentistry during the sessions 1940-41 in the three colleges of the National University of Ireland has recently been given as:

	Dublin	Cork	Galway
First year students	352	79	57
All students	937	360	214

Dr. KENT-JONES and Dr. AMOS summarised the methods adopted during the "vitaminisation" of margarine, in which thorough blending, with avoidance of aeration and critical choice of suitable fats and the application of rapid but adequate control tests at every stage in manufacture, were all necessary to give a satisfactory final product. They gave details of the fortification of bread with vitamin B_1 by the mechanical introduction into the flour stream of a specially prepared flour concentrate, the nature of white flour and crystalline aneurin being such as to make the direct admixture of one with the other impracticable. They also referred to the irradiation of milk, or its fortification with vitamin D in other ways, as carried out fairly extensively in the United States, and to the incorporation of vitamin C in jams and preserves, a procedure not practised on foods to be sold in this country but carried out commercially on supplies intended for British prisoners of war. They mentioned the difficulties that had arisen in the selection of a suitable type of calcium carbonate for the fortification of bread, but said that the creta præparata of the B.P. was satisfactory for this purpose.

METHODS OF ANALYSIS AND CONTROL

After the lunch interval Mr. H. E. COX, D.Sc., discussed the machinery for the enforcement of standards laid down for fortified foods. He thought that, with the lapse of defence regulations, the Minister of Health would be found not to have the powers, at present held by the Minister of Food, to enforce the positive fortification of food, but would return to the status quo ante bellum, under which he would at most be able to prohibit objectionable procedures and demand a maintenance of certain natural standards. New legislation would be necessary if even voluntary fortification was to be permitted and adequately controlled. At present, the addition of wholesome ingredients to foods was not forbidden by law unless this was specifically stated in particular statutes or regulations; it would be desirable for fortified foods to comply with certain legal stated requirements in which both minimum and maximum should be given for each permitted addition. It was most undesirable to make regulations about the quality of food in general, and the nature and quantity of additions in particular, unless adequate analytical methods were available for those who had to help in the enforcement of such regulations. Whether or not official methods of testing were desirable, recognised and standard methods would almost certainly be necessary, and in supplying these both the Food Group and the Society of Public Analysts should continue to play the valuable part they had played in the past. It was ultimately the public analyst's responsibility to secure that fortified foods, like any other foods, conformed with their descriptions on label and advertisement.

The methods at present available for the estimation of minerals and vitamins in foods generally, and particularly in fortified foods, were surveyed in the last paper, on the analysis of fortified foods, by Mr. H. E. MONK. After dividing the available methods into biological, microbiological and chemical or physico-chemical, and referring to the advantages and disadvantages of each, Mr. Monk discussed the special methods devised for vitamin A, vitamin B_1 (aneurin), riboflavin (sometimes incorrectly called vitamin B_2), nicotinic acid, ascorbic acid, and vitamins D (D_2 and D_3), showing that adequate chemical or physico-chemical methods were available for all of these, except for vitamins D_2 and D_3, for which a biological test is as a rule essential. He also referred to the possibilities of a polagraphic method for estimating members of the "vitamin B_2 complex" and to the microbiological methods which are being developed in the United States much more extensively than in this country.

MIDDLESEX HOSPITAL.—It was announced at the meeting of the court of governors of this hospital on Dec. 10 that repairs to the north-east wing were now nearly complete, and part of it had been reopened. Five new huts (200 beds) erected by the Ministry of Health at Mount Vernon Hospital have been allocated to the Middlesex. The Emergency Medical Service is also shortly opening a radiotherapy centre which will be able to deal with 150 patients at the Mount Vernon Hospital.

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Letters to the Editor

SALT-WATER SURGEONS

SIR,—"Dover's powder, the nostrum of a pirate," you say in your issue of Nov. 8 (p. 568). This strange accusation against Thomas Dover, pupil and friend of Sydenham, seems to have been the invention of the late Sir William Osler. The expedition of the *Duke* and *Dutchess*, commanded by Captain Woodes-Rogers on which Dover sailed was in no sense a piratical cruise. In 1708 some members of the Bristol Society of Merchant Venturers fitted out two ships which sailed to the South Seas. Captain Edward Cooke was second captain on the *Dutchess* and left a journal of the voyage which has been published. It is less well known than Woodes-Rogers' book and is the work of a better educated man: in it Cooke says that the commanders of the *Duke* and *Dutchess* had "commissions from his Royal Highness Prince George of Denmark, then Lord High Admiral of Great Britain, Ireland, etc." In other words the expedition sailed under letters of marque. They set out with four other ships, including the *Hastings*, man-of-war under Captain Paul. Commissions were granted to the two ships "to Cruise on the coasts of Peru and Mexico, in the South Seas, against her Majesties enemies the French and the Spaniards." Sir William Osler before his death frequently expressed his satisfaction that Dover was, as he put it, "such a respectable character," and fully retracted the charge of piracy. Dover's place in the expedition was that of representative of the owners, and in that capacity he was president of the council. He did not rank as one of the surgeons. These were, John Ballet who had sailed with Dampier previously, Samuel Hopkins, a nephew of Dr. Dover, James Wasse, surgeon, Charles May, his mate and John Lancy, assistant. Mention is made also of "John Vigor, a reformado, to act as Captain Dover's ensign when ashore." Yet Dover received £423 as chief medical officer in addition to his profits as a shareholder. Woodes-Rogers disliked Dover and complained of "want of sufficient medicines with which till now I thought we abounded, having a regular physician, an apothecary (i.e. Hopkins) and surgeons enough with all sorts of medicines on board." He would have preferred that Dover should have confined himself to the duties of a "regular physician." But this was not Dover's way. When a prize had been taken he claimed, successfully, to be appointed to command her. However the navigating officers felt no confidence in his seamanship and he was forbidden to interfere in any way with the navigation of the ship. It was agreed by a majority of the council (Dover presumably being in the chair) that "Capt. Robt. Fry and Capt. Will. Stretton, shall both act in equal Post in the Sole Navigating Sailing and Engaging, if Occasion should be, under Capt. Tho. Dover, on board the *Batchelor Frigate*"—thus the prize was newly named—"and that the said Capt. Tho. Dover, shall not molest, hinder or contradict them in their business; and we do appoint Alexander Silkirk master." The last-named was Selkirk whom the expedition had taken off the island of Juan Fernandez.

Dover's famous powder, compounded of ipecacuanha and opium, was not introduced by him as a narcotic. It was no "symbol of drowsiness and perspiration" to him. Dover regarded ipecacuanha as the active ingredient in his powder, a drug which was prescribed both as a febrifuge and as a remedy for dysentery. In fact it ranked almost with cinchona bark as a stand-by in the tropics. He added the opium to counteract the nauseating effects of ipecacuanha. Callander, in his "Voyages to the Terra Australis" (London 1768) speaks of this expedition as one of the best organised and equipped that ever left England.

The *London Magazine* for April, 1742, records the death of "Dr. Thomas Dover, famous for administering quicksilver to his patients, in the 85th year of his age. The last years of Dr. Dover's life were spent at Stanway House. . . . He was buried at his own request in the vault belonging to the Tracy family." The statement in Munk's Roll of the College of Physicians that he died in London at his house in Arundel Street is wrong. The register of Stanway Church, in Gloucestershire, contains the entry that Thomas Dover, M.B., was buried there on April 20, 1742. The vault of the Tracy's is under the altar, but the church contains no memorial of the family nor of Dover—an omission which it was Osler's wish to have rectified, but the war of 1914 intervened.

Bristol. J. A. NIXON.

CERTIFICATES FOR EXTRA MILK

SIR,—A good deal has been said in your columns lately about lax certification and multiple certificates, but we look like being put still more severely to the test now with the distribution of extra milk and eggs. Great pressure will be put on us to sign certificates for conditions outside those for which we are entitled to do so. These are very limited; but the indications are quite definite and leave no room for borderline lesions that might be brought within them. Unfortunately these schedules have been issued in such a way that the doctor will have the greatest difficulty in refusing a certificate. No doubt before sending out the instructions the officials of the Ministry of Food thought it over carefully and had good reasons for imposing secrecy on all concerned. They have come under "Confidential Cover—for the information of registered medical practitioners only," with the added heading "Not to be Divulged to the Public." How a doctor is to carry this out with a patient persistently demanding the certificate as a right remains to be seen. After having said ten times "No! your complaint does not come in the schedule of conditions qualifying for priority claims in liquid milk" he is almost bound to show the schedule in order to get the patient out of his consulting-room. We have to consider this in the light of the drink-more-milk campaign of recent years. Many a mother feels she has saved her weedy-looking son from consumption by making him drink a pint of milk a day. Many a shorthand typist who once had a lump in the neck thinks she will get "glands" unless she does the same. After supporting that campaign we cannot go telling them that it really does not matter. We can only say that the Ministry of Food has not got enough to go round, and that they must risk the invasions of the tubercle bacillus as they have the bombing plane. They will take it if they know; but the way in which it has been put forward makes it seem as though the doctors were capriciously depriving them of what they have a right to, and the medical profession was going back on these standards of preventive medicine that they have laboriously been building up of recent years. The reasons for the secrecy which balance these facts must indeed be weighty, and if the Ministry of Food can see their way to advertise the schedule in the daily papers and to post them on the doors of local food offices they will have a far better chance of their instructions being carried out. The people as a whole do not rush to obtain commodities to which they are not entitled and if they know that there is no extra milk for them thousands will refrain from asking their doctors for the certificate. We shall then be in a stronger position to resist the persistent demands of those who through fear or greed badger us for wrongful ones. Under the best conditions this resistance will not be easy.

Streatham. T. B. LAYTON.

POSITION OF THE BODY DURING SLEEP

SIR,—During my short period of clinical work I began to record from every medical case, and indeed from every available colleague or friend, the position he or she took up during sleep. It soon became clear that this was definitely characteristic for each individual. The individual seldom varied the position and when he did he was fully conscious that he had made a change. I often checked the statements of patients during night duty and found them to be correct, and I observed that the great majority maintained their position throughout the night. Two facts which are not unknown to physicians were often found: that people with angina pectoris avoid lying on the left side, and that patients suffering from acute and painful diseases occupy a position in which they feel the pain least. A comparison of the position of the body during sleep in cases of true angina pectoris and of heart neurosis might be worth following up.

I always asked specifically if there was any period in the lives of the subjects when they slept on their abdomen. Many people who did so for long periods were

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cases of either past or present liver or gall-bladder disease. Of 18 cases of catarrhal jaundice 15 had slept on the abdomen from their youth up, or at least for many years, whereas of 392 patients and healthy controls without any history of liver affection only 11 favoured this position. A high proportion of patients with cholelithiasis said they slept on the abdomen. My cases amounted to only 400 and there were obviously too few healthy controls on which to base a conclusion. Further research, however, should show whether this observation in cases of liver affection can be confirmed, and if so whether it is primary or secondary. The abdominal position during sleep may be either the result of the liver trouble or one of the factors which have contributed to it. Some simple considerations seem to indicate that the latter possibility can by no means be excluded a priori. The mechanical conditions under which the bile flows from the gall-bladder vary greatly with the body position, but there are other factors which may play a more important rôle than gravity. The intra-abdominal pressure and its variations caused by respiratory movements (of the diaphragm, &c.) may differ greatly according to the position in which the subject is lying. If he lies on the back, the abdominal wall easily moves upwards when the diaphragm is lowered. But when he lies on the abdomen the anterior abdominal wall becomes much more rigid, so that inspiration should cause the intra-abdominal pressure to rise much more. To these considerations may be added the effect the respiratory variations in intra-abdominal pressure have on the circulation of blood (and possibly lymph) in the liver. One physiologist put it shortly by saying: "The liver is pressed out like a sponge by the breathing movements." These points show that it will not be easy to decide whether the symptom is post hoc or propter hoc, or even one of the causes which predispose to an injury to the liver cell.

These incomplete observations may perhaps encourage someone who has the clinical material at hand to carry them further and throw some light on a subject which seems to have been neglected hitherto.

University of Birmingham. F. SCHÜTZ.

THE STICKINESS OF PLATELETS

SIR,—May I be allowed to make some remarks with regard to your annotation of Nov. 15? In 1929 I published in collaboration with Miss Székély the first functional test for blood platelets. In these investigations the velocity of disappearance of platelets was determined in Kristensen's counting fluid. This was called the velocity of platelet disintegration. Mrs. Payling Wright objects to that designation, showing that many platelets disappear because of sticking to the glass walls. Really neither of the conceptions is absolutely correct. The extravasated platelets undergo a series of changes resulting in their disintegration. Agglutination and adhesion are among these changes. As the direct enumeration of platelets sticking to the glass walls is impossible, we are at the present moment unable to decide how much of the disappearance of platelets in vitro is due to their adhesion and how much to disintegration. In a plaque of platelets adherent to a glass surface it is impossible to decide how many of them are intact. The formation of substances with vasoconstrictor action during the coagulation of blood (O'Connor, H. Freund) suggests a fairly rapid at least partial disintegration. Wright's observation that higher concentrations of anticoagulants lessen the stickiness of platelets is in agreement with the findings of Bürker and others that substances inhibiting the coagulation of blood prevent also the agglutination and disintegration of platelets, and supports the opinion that adhesion and disintegration are two stages of the same process.

Although from Wright's interesting investigations it is evident that a considerable number of platelets adhere to the glass walls and are incompletely if at all disintegrated, we feel justified, for the sake of simplicity, in calling our test the "disintegration test" of blood platelets. We have shown with our method that hæmophilic platelets have a normal "disintegration" velocity. This finding disproves a conception of Howell's which has later been abandoned by Howell himself. The only condition in which at that time the disintegration was found to be absent, very slow or delayed was in thrombocytopenic purpura. Later I described a case of chronic thrombocytopenic purpura in which after adrenalone treatment (Klima) the platelets rose to 1 million, but their disintegration was still absent. The clinical symptoms were not improved. In the last three years the velocity of platelet disintegration has been determined in the Children's Hospital, Birmingham, in a series of cases with hæmorrhagic manifestations by me, by Dr. T. W. Lloyd and recently by one of my laboratory assistants. Five cases of hæmorrhagic disease with normal or only inconsiderably reduced numbers of platelets and absent or retarded disintegration were found. One had a hæmolytic anæmia, one a severe hæmorrhagic disease of the newborn, one a purulent peritonitis (all three with prolonged bleeding and clotting time), and two were clinically typical cases of Werlhof's disease with prolonged bleeding and normal clotting time but with 120,000–150,000 and 220,000–250,000 platelets respectively.

Horwitz has improved our method, using the counting method of Flössner-Hoffmann. He has confirmed all the observations published in our first paper. Shortly afterwards important work on the function of platelets was done by Morawitz and his pupils. Jürgens used the agglutination as a test for platelet function and Morawitz himself has constructed an apparatus for determining the formation of a platelet thrombus. By means of that apparatus the real nature of a familial hæmorrhagic diathesis observed in Finland and described by Willebrand has been elucidated. Unfortunately there are no definite morphological signs of a functional deficiency of platelets. The only certain fact seems to be that platelets with signs of immaturity (large forms with basophilic plasma, Ogata's tails) are also functionally deficient. Glanzmann, who was the first to put forward the conception of a functional disturbance of blood platelets based that idea on morphological findings which unfortunately are contestible. His idea, however, proved to be true, as the functional tests have later shown. In recent years several cases have been described with hæmorrhagic manifestations and extremely large numbers of platelets. They have been called hæmorrhagic thrombocythæmia. In a few of the papers photograms are reproduced of blood films in which not only the large number of platelets can be seen but also that they are not agglutinated, thus more resembling a magnesium sulphate film than an ordinary blood film. We regard it as probable that in that condition the platelets are functionally deficient, their susceptibility to agglutination being reduced.

The Children's Hospital, Birmingham. H. S. BAAR.

WHEN TO TIE THE CORD

SIR,—Regarding your reference to Barcroft's experiments influencing the time when the cord should be tied, I would like to put forward the following suggestion. If oxygen lack, as shown by Barcroft, is the stimulating factor in promoting respiration, surely it means that oxygen is normally cut off at the end of the second stage, and it therefore matters little how early or late the cord is tied from the aspect of apnœa in the fœtus.

As for blood loss to the fœtus, I do not agree with Mr. Chisholm's argument, first, because he considers that bleeding takes place from the fœtus into the placenta until pulsations in the cord cease; and secondly, because he states that the only propelling force of fœtal blood from the placenta is the fœtal heart. He suggests that the cord should be tied earlier because of the risk that the fœtus will lose blood in two ways: by bleeding into the "placental lake" and by actual bleeding from the placental surface at the time of separation. It is difficult to decide how much blood does actually enter the placenta at the end of the second stage. Because the cord is pulsating it does not follow that blood is flowing in it, but merely that the pulsations are transmitted as in any other fluid medium. (If an artery is tied, it still pulsates on the proximal side of the ligature until obliterated by the relatively slow process of thrombosis.) Mr. Chisholm himself infers that, because the inert placental lake may offer such resistance that the fœtal blood-pressure is largely overcome, therefore there is little or no venous return. I suggest that the whole crux of the case is the fœtal arterial blood-pressure versus the passive resistance offered by the placental channels, which at this stage are greatly narrowed by shrinkage

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of the placenta following reduction in size of its surface of attachment to the now almost empty uterus. The "intraplacental blood-pressure" must also by this means be greatly increased, and thus add to the resistance of blood flow from the fœtus. If this is so, the increased intraplacental pressure will mean increased venous return to the fœtus, as well as decrease or cessation of blood loss via the umbilical artery.

So we arrive back at the question of when to tie the cord, not from the point of view of the presence or absence of pulsations in it, but of how long it will take the placental venous pressure to equalise the fœtal venous pressure—i.e., how long it will take the placenta to empty itself into the fœtus. I have always tied the cord rather as a routine procedure than as a carefully premeditated step influenced by the immediate state of the fœtus or a remote one of the infant. At the end of the 2nd stage the exchange of blood gases between maternal and fœtal blood must be negligible, owing to the greatly limited uteroplacental circulation caused by the retracted uterine muscle. For this reason, I cannot see why apnœa in the newborn fœtus can be appreciably influenced by tying or not tying the cord early. What it does influence is the amount of blood returned to the fœtus by the placenta by virtue of its own raised venous pressure, but that there is an appreciable intraplacental pressure is easily shown by the gush of blood which follows removal of the hæmostat from the placental end of the cord.

Mr. Chisholm's second point, concerning the blood loss to the fœtus from the placental surface at the time of separation, depends on how early the placenta separates, which usually does not happen until after the cord has been tied even by those who "stand and wait" before tying it.

To summarise: (1) Apnœa of the newborn fœtus is uninfluenced by the early or late tying of the cord. (2) The amount of blood gained or lost via the placenta in the 3rd stage depends more on the intraplacental blood-pressure, and the time allowed before tying the cord, than on the presence or absence of pulsation in the cord. (3) The fœtus rarely has the opportunity to bleed from the placental surface.

Seaforth, Liverpool. ROBERT C. PERCIVAL

HYPERTENSION

SIR,—We would like to reply to Dr. Izod Bennett's letter of Nov. 29. We did not suggest that Goldblatt's work indicated that hypertension was usually produced by a unilateral renal lesion. We pointed out however that in a few cases hypertension and unilateral renal lesions coexisted, and that in some of these the hypertension has been relieved by nephrectomy. Unilateral renal disease is frequently "silent," and although Dr. Bennett states that each of the cases described in our article had localising signs from the very outset a more careful perusal of case 1 would show that this was not so. It is on this account that we suggested that since in some cases there appears to be an ætiological association (not explained by Goldblatt's work) between hypertension and unilateral renal disease, and since a unilateral renal lesion may be otherwise symptomless, it is most reasonable and humane whatever the financial cost to exclude such a lesion by a complete urological investigation. That this should be carried out in all cases is perhaps an overstatement, but it seems that this is necessary in order to disturb the complacency with which so many clinicians seem to regard this very common disease.

G. O. RICHARDSON,
G. A. SMART.

CRUSH INJURIES

SIR,—The ill effects of "crush syndrome" have been ascribed to the liberation of toxins from the trapped limb after its release. It has been suggested that the application of a tourniquet to the limb before it is released, above the site of compression, might prevent this. There is another sequel of such an injury which might almost be called "release syndrome." Here the patient remains comparatively well and cheerful while trapped, but dies suddenly soon after release, presumably because of an even more violent flooding of the system with toxins. It would be interesting to hear whether M.O.s of mobile units have experimented with tourniquets. In the raids of last autumn many of these patients were not reaching hospital alive or were dying soon after admission, and it might well be that a tourniquet would have saved them.

Highgate. R. L. BENISON.

ANÆSTHETIC FLOWMETERS

SIR,—With reference to the note on flowmeters for gas or liquid in the *Lancet* of Dec. 6 (p. 718), I may state forthwith that I make no claim to have been the first to suggest the use of rotameters for anæsthetic gases and cannot be accused therefore of any attempt to steal the thunder of Richard Salt of the Nuffield Department of Anæsthetics. Nevertheless, in recognition of valuable help extended to me in the past by instrument makers, I feel that the moment is opportune to record the following facts.

In 1928 Messrs. Siebe Gorman & Co. Ltd., made flowmeters of the rotameter type to my specification for N_2O and O_2. After clinical trial these flowmeters were fitted to an anæsthetic apparatus made for me by Messrs. Allen and Hanburys in the same year. In 1932, following an inquiry from Mr. A. Charles King, the Rotameter Company offered to make rotameters for N_2O and O_2, calibrated for anæsthetic purposes. I am informed that the original correspondence between Mr. A. Charles King and the Rotameter Company is still in existence. While it is more than probable that rotameters were used in connexion with anæsthesia in Germany before 1932, it is thus apparent that in England the possibility of using them for anæsthetic purposes was mooted before 1937, and by Mr. A. Charles King.

Harley Street, W.1. I. W. MAGILL.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS, M.P.

THE parliamentary week under review began with the declaration of war against Japan on Dec. 8, included a statement by the Prime Minister on the war situation, which is to be the subject of a debate, and was filled in with the second reading, committee stage and third reading of the National Service Bill No. 2. In the House of Lords the first and second readings of the bill took place and it will pass into law at once. Provision was made during the week for a debate on the allowances granted to the dependants of the men in the services. There was also a debate fixed on a Supplementary Vote of Credit for War Expenditure and for the passage of a special Consolidated Fund Bill through all its stages.

* * *

The impact of such tremendous events as the extension of the war to the Far East and the Pacific Ocean, the virtual mobilisation of the whole nation for war purposes and the further drawing of astronomical sums of money for war expenditure are rather stunning in their effect on parliamentary practice. But criticism and the normal work of Parliament continue. The Prime Minister was able to clear up a little parliamentary storm which grew out of a misunderstanding of the effect of the new bill on M.P.s of the age-groups called on to serve. It has in fact been the recognised practice for some time to leave it to individual M.P.s to judge where their duty lies and whether they should serve in the forces or in Parliament. It has also been the practice that an M.P. in the forces wishing to be freed to devote himself to parliamentary duties is given this freedom. But some members were not aware of this as these rules and practices had not been embodied in a considered statement.

The Prime Minister made it clear that while it would not be appropriate to confer on members a statutory exemption from the obligations they share in common with everyone else they have also "the high duty" of service in the legislature. They are therefore given a free choice by virtue of their position as Members of Parliament and not as a favour.

* * *

Mr. Bevin as Minister of Labour in charge of the National Service Bill has done a long and difficult job effectively within the limits imposed by the form of the

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bill, but there have been some breezes, one of which ruffled Mr. Henderson Stewart, who had made certain criticisms of the A.T.S. The words he used were, "We hear in this House and in the Lobbies the reports of medical officers about the conditions in the camps. There is not a constituency of which I have ever heard that has not this general but very definite impression that the A.T.S. is not the sort of Service to which a nice girl goes." Sir Percy Harris interjected "Hear, Hear," and Mr. Stewart continued, "My right hon. friend has apparently had the same experience," and called on the War Office to do something drastic and on Mr. Bevin to take drastic measures to remove "these unfortunate conditions." Mr. Bevin's reply to this was to say, "Why is there, concerning the A.T.S., the assumption that because women are drafted somewhere, immorality is bound to ensue? That is a lot of unutterable nonsense. . . . I say that the conduct of our young people during this war has been cleaner than in the whole history of our country."

Mr. Henderson Stewart at once protested, "I was not for one moment thinking about morals. I was thinking about the physical conditions in which they live. I think the morals are excellent." Mr. Henderson Stewart should have used plainer words about the lack of proper camp accommodation and dirt in the A.T.S. quarters and it is unfortunate that this suggestion of immorality among the A.T.S. was dragged into the debate through a misunderstanding. The facts are all against it. What is true and what needs improvement is the arrangements for the comfort of A.T.S., including lavatory and washing accommodation. But this is also true of the W.A.A.F.s—as Mr. Bevin indeed suggested. After this little fracas Mr. Bevin went on to speak of the provision of hostels and welfare arrangements but as these matters are outside the scope of the bill they could not be dealt with by amendment.

What did come out of the debate is a bill which will be an act by the time these words are in print. That act gives the Government very drastic powers over the whole population and especially over the age-groups 18–65. In the original discussion of the Maximum Effort resolution tabled by the Government, the Speaker described this as a de-facto "first reading" discussion of the bill. But it turned out to be nothing of the kind. The bill is limited to powers over persons. The provision of welfare and medical services is not touched and could not be discussed. They are left as far as legislation is concerned to some date in the future and there is uneasiness about them in the minds of members.

Another matter left out of the act—although adumbrated in the original Government resolution—is the position of young people from 16 to 18. These young people are to be looked after and directed as to their activities and there was some suggestion that they should be under the services. This suggestion was contested and the "direction" is to be through the Board of Education and voluntary youth societies. It is all rather vague but the situation is to be explored in a debate on the adjournment at an early date. But if youths of 16 are eligible for Home Guard duties and the Air Training Corps, it is hardly clear how the services can be kept out, or whether they should be kept out. The nation even at this stage has not got really used to total war. We don't like young people being drawn into the war. But perhaps the best we can do is to keep the control of any "direction" in the hands of the Minister of Education. And these directions will have to be carefully considered for it is on the shoulders of the youth of today will lie the heavy responsibilities of directing democratic opinion in the decade after the war.

FROM THE PRESS GALLERY

National Service Bill

IN the debate on this bill in the House of Commons it was pointed out, almost fearfully, that in conscripting our women we are "actually taking the initiative," for the Nazis have failed in the attempt, and noble Lords in the upper house thought the bill was "a tremendous compliment to democracy." Both houses were anxious that the Government should recognise that there would probably be a higher rate of sickness, breakdown and discharge among the men of the age-group 41–51 than among their juniors. Sir E. GREGG promised that their duties would be carefully allocated according to their medical grade, but it was generally felt that the Government should consider the pension claims of these men sympathetically.

Moving the second reading of the bill in the Commons Mr. E. BEVIN confessed that the human is the most awkward animal of all to handle, but proved himself adroit in the management of his colleagues. He gave an assurance that one woman doctor should be present at the medical examination of women. He also gave a pledge that if a man has been discharged on medical grounds he will not be called up again, but would be directed into industry. Mr. T. M. SEXTON urged that when women left home to work in another district they should register at once with a panel practitioner in the new area. Sir FRANCIS FREMANTLE called attention to the need to safeguard the water-supplies of the country. Water undertakings must be allowed to keep some of their skilled personnel. Dr. HADEN GUEST asked the minister to give some indication of the provision he would make for hygienic and medical supervision in the new factories. There was a shortage of medical manpower, and they would not get what they wanted unless they had the whole medical services of the country pooled. Mr. BEVIN replied that he could not deal with the nationalisation of the medical services by this bill; they were constantly being expanded and he had early made a great innovation by introducing a compulsory medical service in industry, which now included nursing. Mr. R. DAVIES said the bill had as its background the population problem, and asked what effect the conscription of women would have on the birth-rate.

In the debate in the Lords on Dec. 12, Lord MOYNE was able to reassure Lord GREVILLE about the provision of domestic staff for hospitals. Last week Lord Greville complained that these workers were steadily seeping away. Now an order is to be made laying down that no woman between 20 and 30 working in a vital industry—which includes hospital work—may change her employment except with the approval of the Minister of Labour.

War-time Nurseries

At the cinema the news reel informs us that we "live in the presence of history." Against this background the question "What to do with the children" may seem trivial. But as Lord NATHAN pointed out in the House of Lords on Dec. 9, when asking the Government what provision they were making for war-time nurseries, the need for an answer is urgent if we are to make full use of our woman-power. Industry is dependent on what might be called immobile mothers, and it is essential to morale that women should have confidence that the arrangements made for their children are adequate. Minders are no doubt all very well, but he reminded his peers that children under five are brittle. It had been stated that by the early part of next year 500 nurseries would be open, taking an average of 40 children each, or 20,000 in all. But Lord Nathan suggested and he believed that it was an understatement that 200,000 children would have to be provided for, and provided for at night as well as in the day. And what was to be done about the children between five and fourteen during school holidays when their mothers were at work? The Government were confronted with a great social problem. Upon the right solution depended the health and happiness of the generation for which we were fighting.

Lord SNELL acknowledged the Government's responsibility for what was a human as well as an industrial problem. He did not suggest that the figures given by Lord Nathan were exaggerated, because no-one at present could estimate what the intake of married women into industry would be; but the Government's answer was that first it was necessary to observe the rate of intake and then to try to provide sufficient nurseries to meet the demand, but instructions had been given to local authorities to prepare for the expected need and to be ready for quick development. The Ministry of Health, the Ministry of Labour and the Board of Education were collaborating closely in this matter and so were the local maternity and child welfare and the education authorities. At the end of November 194 nurseries were in operation, and a further 209 approved, but not yet in full action, providing for something over 15,000 children. A further 264 were in active preparation and

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the Government felt that this programme was fairly satisfactory. But Lord NATHAN said that neither he nor the other Labour Lords could agree. It might be sound policy to observe the intake of married women into industry and then take action if this matter were being dealt with as one of child welfare in a scheme of social readjustment. But the problem was to get the mothers into industry, and the provision of accommodation for the children is the inescapable precedent for these women going into industry at all. He therefore hoped that the Government would ensure that steps were taken in advance of the intake and did not lag behind it.

QUESTION TIME

Inspection of Mental Defectives

Mr. H. C. CHARLETON asked the Minister of Health the number of visits made by the commissioners and inspectors of the Board of Control to mental defectives under statutory guardianship in the administrative area of the county of London during each of the 12 months ended michaelmas in the years 1939 and 1940.—Mr. E. BROWN replied: The numbers of visits by commissioners were 98 and 0 respectively, and the number of visits by inspectors were 35 and 4 respectively. Article 83 of the Mental Deficiency Regulations, 1935, permits but does not require visits by commissioners or inspectors and arrangements have been made to visit all cases placed under guardianship in the years 1940 and 1941 and establishments where there are a number of mental defectives under care. I am informed by the London County Council that their officers have duly made the visits prescribed by Article 86 of the regulations.—Mr. CHARLETON: Is the Minister not aware that the figures he has given reveal a serious evasion of duty by the Board of Control? How can the commissioners carry out their duties to these unfortunate people if they do not see them and understand their condition? Is he aware that there is evidence that some have not been visited for a number of years? Is he aware that the figures in 1939 should have been in the neighbourhood of 550 and in the next year 500?—Mr. BROWN: The commissioners were working under great difficulty and as he knows the inspectorate has other duties to perform in addition.—Mr. CHARLETON: Does the Minister not see that the first duty was during a prewar period when there were no difficulties?

National Wheatmeal Loaf

Sir ERNEST GRAHAM-LITTLE asked the Parliamentary Secretary to the Ministry of Food to what proportion of the population the white loaf, fortified in accordance with the undertaking given in July, 1940, was now supplied; what proportion of the consumption of the national wheatmeal loaf now bore to the total consumption of bread in this country; what had been the expenditure to date by the ministry in advertising the national wheatmeal loaf, and whether the Ministry had now abandoned or diminished such advertising.—Major G. LLOYD GEORGE replied: Figures relating to the proportion of the population to whom the fortified white loaf is now supplied are not available, but approximately 25% of the white bread and flour consumed in the United Kingdom is now being fortified with vitamin B_1. It is estimated that 7% of the bread consumed is in the form of the national wheatmeal loaf. The expenditure to date on advertising national wheatmeal is £29,000. The advertising has included many thousands of posters which are displayed in all parts of the country. The use of national wheatmeal bread and flour forms an important subject in the ministry's food advice service to housewives. The ministry has not abandoned this advertising but there is a wide range of subjects to be covered in the space available for the ministry's; consequently there are periods during which there is space for no more than occasional mention of wheatmeal in advertisements primarily devoted to other subjects.

X-ray Examination of Recruits

Sir FRANCIS FREMANTLE asked the Minister of Labour whether he had considered the adoption by medical boards of X-ray examination for tuberculosis of every recruit, in the light of American experience, and in the interest of those found to be affected and of Exchequer liabilities.—Mr. ERNEST BEVIN replied: This suggestion was fully considered last year by the Medical Advisory Committee under the chairmanship of Lord Horder, and the committee decided that its adoption was impracticable. I am advised that this is still the case.—Sir F. FREMANTLE: Can the Minister explain why it was found practicable in America but not here?—Mr. BEVIN: I understand that at the time it was a question of preparing a complete supply of equipment.

Increase in Juvenile Delinquency

The number of persons under 17 years of age annually found guilty of offences in England and Wales has increased since the war by about 30%. (Mr. H. MORRISON replying to Mr. D. L. LIPSON.)

Certificates in War-time

In answer to a question Mr. BROWN said: I have been asked by the British Medical Association to consider whether steps can be taken to reduce the demands made on the medical profession for certificates in connexion with war activities. A conference took place between representatives of Government departments and of the association at which the whole matter is now being considered by the departments individually with the object of reducing to a minimum the number of purposes for which medical certificates are to be required.

Suspension of Dudley M.O.H.

Captain G. S. ELLISTON asked the Minister whether he proposed to intervene on behalf of the M.O.H. for Dudley who had been suspended for the duration of the war because he had registered as a conscientious objector, as permitted by the Military Service Act.—Mr. BROWN replied: The appointment, dismissal or suspension of the M.O.H. of a county borough does not require my approval and I have no authority to intervene between the council and their officers in this matter.

Diphtheria and Immunisation

Sir F. FREMANTLE asked the Minister whether he had any statistics of the results of immunisation against diphtheria in New York, Chicago and Toronto as compared with London.—Mr. BROWN replied: In New York City, since large-scale immunisation of children began in 1929, diphtheria has steadily decreased from an average of about 10,000 cases a year during 1920–29 to just over 400 cases in 1940, in relation to a population of over 7 million. Information about Chicago is not readily available. In Toronto in the five years during 1933–37 there were no more than 209 cases of diphtheria in all. In two of these years, 1934 and 1937, there was not a single death, while in 1940 there was neither a notification nor a death. In the county of London, with a population of about 4 million, notifications of diphtheria in recent years have averaged close on 8000 cases a year.

Committee on Nurses Salaries

In reply to a question from Miss M. LLOYD GEORGE Mr. BROWN said: The committee on nurses salaries held its first meeting on Nov. 27. It is my intention that the committee's scope should extend to nurses possessing or in training for the certificate of the Tuberculosis Association, and that it should also extend to health visitors. Before the scope is so extended it may be necessary to make some adjustments in the committee. I have decided to set up a separate committee to draw up agreed scales of salaries for midwives on a national basis. Lord Rushcliffe will act as chairman of the committee for midwives as well as of that for nurses. Some nurses and midwives posts involve the practice both of nursing and of midwifery and I shall request the committee to consult together before making recommendations about these overlapping matters.

Leprosy in the West Indies

Mr. G. H. HALL in reply to a question from Dr. H. B. MORGAN gave the following table setting out the incidence of leprosy in the British West Indies.

Colony	Year	New cases	Total cases	Population
Bahamas	1940	3	17	70,332
Barbados	1939	5	63	193,082
Jamaica	1939	N.S.	249	1,195,465
Turks and Caicos ..	1938	2	5	5300
Antigua	1940	N.S.	6	36,073
St. Kitts	1939	3	59	37,994
Montserrat	1939	N.S.	N.S.	13,541
Virgin Islands	1940	N.S.	N.S.	6135
Trinidad and Tobago ..	1939	77	377	473,455
St. Lucia	1939	5	29	69,737
St. Vincent	1940	0	18	61,421
Grenada	1939	0	12	90,085
Dominica	1940	3	17	52,738
Bermuda		0	0	30,814
British Guiana ..	1939	45	565	341,237
British Honduras ..		N.S.	N.S.	57,767

N.S.=Not stated.

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Obituary

FRANCIS HENRY MOSSE

M.R.C.P.

EARLY this year Dr. Mosse, who had been working as a medical missionary in China since 1920, fell ill with tuberculosis and was sent to America for treatment. He seemed to be making good progress and his death on Dec. 6 after an operation was unexpected. Robin Mosse, as his friends called him, was the son of the Rev. E. H. Mosse, vicar of St. Paul's, Covent Garden. He was educated at King's School, Canterbury, and Trinity College, Oxford, and qualified from King's College Hospital in 1913. During the last war he served as captain in the R.A.M.C. in Egypt and Palestine and was with General Allenby's forces at the capture of Jerusalem. His heart was set on medical missionary work, and after taking the M.R.C.P. he sailed for China, under the S.P.G., to take up the post of physician at the Cheloo Christian University at Shantung, in North China. Here for twenty years Mosse trained young Chinese men and women—"A picked group of the finest students in the world," he called them. He counted himself "the happiest man in Asia" to be allowed to serve them, and he worked with them in refugee camps in times of flood and famine, as well as in the lecture halls and wards of Cheloo Hospital. After the Japanese occupation of North China most of the 4000 students at Cheloo trekked west to free China, but the hospital remained, and Dr. Mosse stayed with it. He leaves a widow and two daughters who are in the United States.

ELWIN H. T. NASH

M.R.C.P., D.P.H.

THE loss of Elwin Nash brings a flood of memories. Nash was no ordinary official. The fire of the enthusiast burned brighter in his eye as each year added to his age. It was in fact in the later years of his life that he really found his feet and became a pioneer in public health.

Cromwell Studios, Hounslow

One of the particular qualities for which we admired him was his practical mastery of the improvements he advocated. Years ago he came to the conclusion that many of the nutritional problems of the nation would be solved if it were taught to buy better and to cook more skilfully. He wrote a book on the subject and sold it at a price which the poorest could pay. And before writing it he went into the kitchen and became a first-class cook himself. For him armchair administration did not exist: "I attend at one welfare clinic and at one school clinic regularly every week." To know that a thing was good and needed in public health was sufficient to awaken his determination that his district should pioneer. He was one of the first to commence immunisation against diphtheria on a large municipal scale; the records he kept were meticulously accurate. One day a dentist spoke to him of the disastrous effects in appearance and in health that could arise unless children's teeth were carefully regulated. What was good enough for Park Lane was good enough for Heston and Isleworth, and he started a clinic where the poorest in his district could obtain orthodontic treatment. Elwin Nash just could not let disease go untreated. He gave a lecture on myxœdema at the Society of M.O.H.'s and confessed how he had secured his patients. "I saw them in the bus, I saw them in the train and in the street. I stopped them and secured treatment for them; if I offended against ethical canons, I place myself without reserve in the hands of you who are my colleagues and friends." He was an enthusiast and a fighter. Yet big, burly and determined, no-one had a gentler touch with children; they trusted him and realised he would look after them as individuals—just as in the bigger realm of public health his council trusted him to look after them as a community.

D. H. G.

Elwin Harral Thomas Nash was born in 1872 in Guernsey, the eldest son of Joseph Nash, R.I. He was educated at St. Paul's School and St. Thomas's Hospital, qualifying in 1896, after which he filled a series of house-appointments in London and the Home Counties and assisted in several departments at St. Thomas's. Then for a while he was in general practice at Accrington, but after taking the D.P.H. at Manchester and holding a public-health research scholarship he went to Derby to assume charge of the isolation hospital, became assistant M.O.H. there and then M.O.H. of Wimbledon, finally ending up at Heston and Isleworth. In 1938 just after his retirement the society of M.O.H.'s elected him president, and at their annual banquet he foretold amazing developments in the growing association between practitioner and health officer which he did much himself to foster. Many of the high lights of his work have been noticed in these columns, among the more recent an early venture (1934) in the use of adult serum to modify measles in fever hospital contacts, a forecast of planned obstetric practice (1937), and some indication of the aim and purpose of "Dr. Nash's Cookery Book." In 1899 he married Mary Monica Oldershaw, who survives him with four sons and a daughter.

ERNEST JOHN FRANK HINDE

M.R.C.S.; CAPTAIN R.A.M.C.

IN a recent casualty list it is announced that Captain E. J. F. Hinde has died of wounds. He was born in 1912, the eldest son of Dr. E. B. Hinde of Norwich, and was educated at Gresham's, and Emmanuel College, Cambridge, where he won his athletic colours. At Guy's he played hockey for the hospital and occasionally ran, but here his keenness for his work left him little leisure. He qualified in 1938 and the following year obtained a house-appointment at Guy's, but soon after the outbreak of war he resigned to join the R.A.M.C. He served at first with the East Anglian field ambulance, as his father had done in the last war, and afterwards with another field ambulance. Later he volunteered for foreign service, and it was on his way abroad that he met his death at sea. He married Miss Norah Steeds in 1940.

Polyfoto

ANTONY FLEMING BALDWYN

M.B. LOND.; FLYING-OFFICER R.A.F.

Flying-Officer Baldwyn has been reported missing but is presumed to have lost his life on active service in the Middle East. He was the eldest son of the late Captain C. F. Baldwyn. He entered St. Bartholomew's Hospital in 1935 and took his London degree last year, at the age of twenty-two, and joined the R.A.F. after six months as house-physician at the base hospital of the Bart's sector. One of his friends writes: Baldwyn showed aptitude for learning new things quickly, and he applied his knowledge for his patients. He was good at most games and could sail any sort of boat.

DAVID ROBERTSON TAYLOR

B.A. CAMB., M.B. EDIN., D.P.H.

Dr. Taylor, who died at his home in Belfast on Nov. 8, was the only surviving son of the Rev. D. A. Taylor, D.D., of the Presbyterian Church in Ireland. Born in 1870, Taylor was educated at the Royal Belfast Academical Institution and Cambridge University where he took his degree in 1901. He proceeded to Edinburgh University and graduated M.B. in 1906. After service in the R.A.M.C. he obtained the D.P.H. at the Queen's University of Belfast in 1918. He was a medical referee under the National Health Insurance scheme in Northern Ireland, and was engaged in general practice until the day before his death. In 1903 he played rugby for Ireland, but cricket was his enduring passion and he played for Gentlemen of Ireland in 1924. An accomplished musician he was an enthusiastic member of the British Music Society of Northern Ireland. David

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Taylor's qualities of simplicity and modesty won him many friends and his unfailing gentleness and kindness were valued by his patients. He leaves his widow with two daughters.

DERMOT HARRY TUTHILL DUGGAN
M.D. DUBL.; SURGEON LIEUTENANT R.N.V.R.

Surgeon Lieutenant Duggan, who was reported missing in August 1940, is now posted as missing, believed killed in action. He was serving on H.M.S. *Ardent* which took part in convoying troops to Narvik and was lost in battle off the coast of Norway in June, 1940. He was the only surviving son of the late Captain George Grant Duggan, who was killed at Gallipoli in 1915. Duggan was educated at the Imperial Service College, Windsor, and entered Trinity College, Dublin, in 1929. He graduated in arts in 1933, and in medicine in 1935. He was an active member of the Dublin University harriers, of which his father had once been captain. He passed his examinations punctually, and after qualifying in the minimum time he held house-appointments at the Fermanagh County Hospital, Enniskillen, and at the Kent County Ophthalmic and Aural Hospital, Maidstone. He also travelled to New Zealand as surgeon on the s.s. *Durham*. In 1939 he was granted his M.D. for a thesis on chemotherapy in acute ear disease which was later published in the *Irish Journal of Medical Science*.

Medical News

Royal College of Surgeons of England

At a meeting of the council of the college held on Dec. 11, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. Seymour Barling was reappointed representative on the court of governors of Birmingham University, Mr. L. E. C. Norbury as representative on the Central Council for District Nursing in London.

Diplomas of fellowship were granted to the following candidates:—

E. O. Harris, M.B. Lond.; H. E. Blake, L.R.C.P.; P. M. G. Russell, M.B. Lond.; V. A. J. Swain, L.R.C.P.; T. L. S. Baynes, M.D. Lond.; B. G. A. Lilwall, M.B. Lond.; E. W. O. Adkins, M.B. Camb.; G. A. Fairlie-Clarke, M.B. Lond., R.N.; A. R. Leask, L.R.C.P.; S. I. Green, M.B. Lond.; H. J. Richards, M.B. Lond.; James Moroney, M.B. Lpool; G. M. Müller, M.B. Lond.; A. G. Apley, M.B. Lond.; J. B. Kinmonth, M.B. Lond.; D. A. J. Ebrill, M.B. Lond.; H. E. Hobbs, M.B. Lond.; W. H. Weston, L.R.C.P.; E. T. Taylor, B.M. Oxfd; L. H. Aitken, M.B. N.Z.; H. B. Boctor, M.B. Cairo; C. H. Cullen, M.B. Belf.; Stephen Eisenhammer, M.B. Edin.; J. D. Gray, M.B. Sheff.; C. G. D. Halstead, M.B. N.Z.; J. N. Nish, M.B. Melb.; C. M. Ley, M.B. Melb.; William Parke, M.B. Lpool; J. J. Richmond, M.B. Melb.; W. E. Springford, M.B. Lond.; and Norman Waddle, M.B. N.Z.

Diplomas in anæsthetics were granted, jointly with the Royal College of Physicians, to the following:—

J. B. Adams, J. H. Crawford, H. de L. N. Davis, D. C. Devitt, R. R. Dickson, J. K. A. Dorman, Henry Edwards, H. R. W. Franklin, Ysobel M. Garland, E. F. Gleadow, T. C. Gray, P. S. A. Heyworth, Werner Kupfermann, C. B. Lewis, A. M. McKinlay, J. V. Mitchell, L. G. Morrison, G. B. Oliver, Joseph Patterson, George Quayle, G. M. Rose, Enid B. Roulston, R. D. Scott, R. P. W. Shackleton, A. A. Shein, Janet Todd, E. C. Whitehall-Cooke, Joyce Worthington, and A. M. Young.

Royal College of Physicians of Edinburgh

At the annual meeting of the college on Dec. 4, Prof. Charles McNeil was re-elected president and the following council was elected for the coming year: Dr. R. B. Campbell, Dr. L. H. F. Thatcher, Prof. D. M. Lyon, Dr. A. G. Ritchie, Prof. L. S. P. Davidson and Dr. A. Rae Gilchrist. Professor Lyon was nominated vice-president.

First Polish Graduates in Edinburgh

There was a historic addition this year to the small winter graduation at Edinburgh University on Dec. 12, when the first degrees were conferred on students of the Polish School of Medicine at the university. Sir Thomas Holland, the vice-chancellor, presided and the degrees were conferred with the authority of the Polish government by Prof. A. T. Jurasz, dean of the Polish faculty of medicine. The new Polish graduates were Miss Jadwiga Mickiewicz of Warsaw, Second Lieutenant Stanislaw Schta, Asp. Wladyslaw Kazimierz Gatuszka and Asp. Ferdinand Solich, all of Cracow.

22nd General Hospital R.A.M.C.

The fifth week-end course in war medicine will he held at this hospital on Jan. 3 and 4. The visiting lecturer at this course will be Mr. H. Morriston-Davies.

Medical Honours

The M.B.E. has been awarded to Dr. W. L. M. Bigby and Dr. John Findlay.

Dr. Bigby, who is assistant medical officer for civil defence at Southampton, has worked long hours helping to extricate trapped people and has several times entered wrecked buildings to relieve the suffering of the injured.

Dr. Findlay, who is in charge of a first-aid post at Peterhead, was thrown to the floor and injured when a bomb burst, but at grave risk to himself he crawled under debris and gave injections to three casualties.

Posthumous Honour

The Royal Meteorological Society has awarded the Symons gold medal for 1942 to Dr. J. S. Owens, whose death was recorded in our columns last week.

King Edward's Hospital Fund

This year the fund is again distributing £300,000 among the voluntary hospitals of London. The fund is now proposing, with the help of the Nuffield Trust, to extend the work of its nursing recruitment service to provincial training schools.

West Ham Practitioners Coördinating Committee

The discussion group of this society will meet for the first time on Tuesday, Dec. 23 at 2.30 P.M., at the Y.M.C.A. Hall, Woodgrange Road, Forest Gate, E.7, to consider the extension of the panel system versus an all-out state medical service. Dr. A. V. S. Davies will speak in favour of an extension of the panel system, and Dr. R. N. Brandwood will advocate a state medical service. Practitioners from adjoining areas are invited to attend.

Births, Marriages and Deaths

BIRTHS

ARTHUR.—On Dec. 4, at Wolverhampton, the wife of Squadron-Leader Hugh Arthur, F.R.C.S.E., R.A.F.V.R.—a daughter.

BONNELLA.—On Dec. 11, at Oxford, to Dr. Gertrude Bonnella (*née* Afoumado), wife of F. George Bonnella, of Chinnor—a daughter.

BOLAM.—On Dec. 7, at Gosforth, Newcastle-on-Tyne, the wife of Dr. Mason Bolam—a daughter.

BRYAN.—On Dec. 4, at Plumstead, Capetown, the wife of Dr. T. B. L. Bryan—a son.

DANIELS.—On Dec. 13, at Grantham, the wife of Dr. Marc Daniels—a daughter.

LUNN.—On Dec. 12, at Guildford, the wife of Captain H. Fletcher Lunn, R.A.M.C.—a daughter.

RIORDAN.—On Dec. 7, at Newcastle-on-Tyne, the wife of Captain T. P. Riordan, M.B., R.A.M.C.—a daughter.

SODDY.—On Dec. 13, at Cambridge, the wife of Temp. Major Kenneth Soddy, R.A.M.C.—a daughter.

THOMAS.—On Dec. 3, at York, the wife of Dr. René Thomas—a daughter.

MARRIAGES

CUDDIGAN—REDFERN.—On Dec. 10, at Ripley, Simon Thomas Cuddigan, M.B., to Betty Redfern.

DUFFY—BOWERS.—On Nov. 29, at Chichester, Charles Allan Gavan Duffy, M.R.C.P., captain, R.A.M.C., to Margaret Marianne Lucy Bowers.

ELLIOT—HICKS.—On Dec. 9, at Blockley, Glos., Thomas Elliot Elliot, F.R.C.S.E., major, R.A.M.C., to Mary Catherine Hicks.

DEATHS

CARMICHAEL.—On Dec. 7, at Lahore, John Carmichael, F.R.C.S.I., lieut.-colonel, R.A.M.C., retd., of Srinagar, Kashmir, aged 87.

MOORE.—William David Moore, M.B. Edin., captain, R.A.M.C., aged 43.

MORTON.—On Dec. 10, at Glasgow, Hugh Morton, M.D. Glasg., F.R.F.P.S.

RUDOLF.—On Nov. 2, in Toronto, Robert Dawson Rudolf, C.B.E., M.D. Edin., F.R.C.P.

SOUTH.—On Dec. 7, at Banbridge, N. Ireland, Frank Montague Wilson South, M.R.C.S., of Peckham.

Appointments

CAMERON, DONALD, M.B. Edin.: examining factory surgeon for Plymouth East.

CLEVELAND, A. J., M.D. Lond., F.R.C.P.: medical referee for Downham Market, East Dereham, Fakenham, Holt, King's Lynn, North Walsham, Norwich, Swaffham, Thetford and Wymondham.

LLOYD, ALEXANDRA, M.B. Glasg.: examining factory surgeon for Stewarton, Ayr.

MCCLATCHEY, S. J., M.B. Belf., D.P.H.,: temp. asst. M.O.H. for Kent.

WILLIAMS, MARJORIE, M.B. Birm.: temp. asst. M.O. (maternity and child welfare) for Northampton.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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Notes, Comments and Abstracts

THE STUDENT ON HIS STATE

THE British Medical Students Association, which is the only national organisation claiming to represent medical students, and has the status of a faculty committee of the National Union of Students, has been asked by the Medical Planning Commission to draw up a memorandum on the reform of the medical curriculum. In order that opinion may be as nearly unanimous as possible when the memorandum is drafted, the B.M.S.A. suggest that special committees should be set up in the different medical schools to organise wide discussion and send in reports. To make this easier, the B.M.S.A. have drawn up an outline,[1] summarised here, of some of the points which it is hoped to cover.

The emphasis, in medical education, should be on the maintenance of health, and the prevention of disease rather than on cure. No suitable student should be debarred from medicine for financial reasons, and all medical schools should be open equally to men and women. A state medical examination might replace the varying examination standards now existing. More full-time salaried teachers should be appointed. Vacations for students might be reduced in the preclinical years, but should be at least six weeks annually during the clinical years.

The premedical course should provide a broad scientific basis. Thus, biology should be taught as a general study of life rather than as a detailed study of a few forms representing specialised ends of evolution; chemistry and physics should be taught with more emphasis on general principles, and the course might be widened to include the elements of sociology, anthropology and genetics. In the preclinical years there should be more emphasis on scientific and experimental method; the teaching of anatomy and physiology should be coördinated, and there should be more attention to the developmental approach and to surface anatomy; clinical cases should be used to illustrate anatomical and physiological principles.

During the clinical years the teaching of hygiene should be incorporated in a fuller course on preventive medicine, and psychological medicine should be taught more thoroughly. A course in general pathology should be completed by the end of the first three months of clinical work. Clinical instruction should be organised for small groups rather than large classes, and the basic teaching should be in the form of tutorials. If attendance at them is compulsory, means must be devised to ensure that the standard of formal lectures is maintained. The value of the clinical material in hospitals under the sector and regional schemes is appreciated, and the aim after the war should be to extend still further the number of hospitals in which experience can be gained. Finally, a hospital education is not felt to be enough; students should get experience of general practice either by a system of apprenticeship to selected general practitioners or by a dispensary system similar to that in operation at some Scottish medical schools.

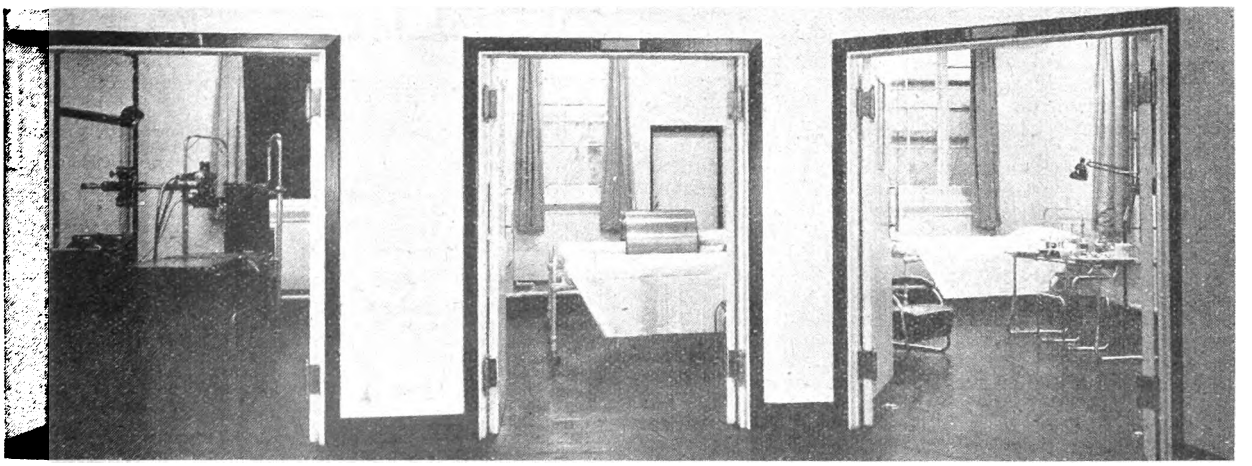
The B.M.S.A. suggest that members of the various medical schools, besides sending in additions to or criticisms of the outline, should review the system of education at their own schools, indicating the hours spent at lectures and ward rounds, in the wards and in the outpatient departments, and giving their experience of the value of work in base and evacuation hospitals; and should send in a detailed account of the reforms they would like to see in their own schools.

1. Students and Medical Education. 2*d*. Copies may be obtained from the hon. secretary, B.M.S.A., 3, King's Parade, Cambridge.

THE DIABETIC FRONT

THE diabetic clinic of University College Hospital has published a handbook giving its war-time diets and instructions for diabetic patients (Diabetes in Wartime. London: H. K. Lewis and Co. 1*s*.). Prof. H. P. Himsworth's hand is evident in the book, although his name does not appear. The booklet sets out the rules of the Food Ministry dealing with extra and substitute rations for diabetics, and gives practical advice on special identity cards and discs, precautions against shortage of insulin and interruption of routine by air-raids, evacuation and the like. The usual advice to send for medical help promptly when a diabetic develops a complicating illness, is emphasised and the patient is told what to do about food and insulin if the doctor is delayed. The diets are adapted to the present rationing scheme, and range by steps of 250 calories from 1500 to 2500 calories. Two skeleton diets are given at each level and a substantial list of alternatives is added at the end. The content of these diets in calcium and vitamins A, B_1, and C is well above the accepted standard requirements. A 1000-calorie diet for use during recovery from coma and another for the temporary invalid or convalescent are also included. The book ends with half a dozen recipes for puddings and a ruled sheet on which the patient can keep notes of his diet, insulin dosage and weight. There is only one criticism: the diets aim at a high standard of precision in weighing and no alternative household measures are given for those patients who cannot be expected to weigh "an extra ¼ oz. bread and an extra ⅛ oz. butter."

THE AUSTIN MEDICAL DEPARTMENT



The X-ray, resuscitation and treatment rooms opened by Sir David Munro at the Austin works, Birmingham on Dec. 3. The new department also contains treatment rooms for men and women, a bathroom, an examination room, a consulting room, a laboratory, doctors' rooms and an office for clerical staff and record filing; it is staffed by three doctors and a nurse with experience of radiography, and serves the 25,000–30,000 workers employed. The medical officers will investigate health problems and occupational illness, give immediate treatment for major and minor injuries and illness, undertake medical examinations, grade a man's work to his capacity after sickness, and supervise the nurses in charge of ambulance rooms throughout the works.

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HOW IT WAS DONE

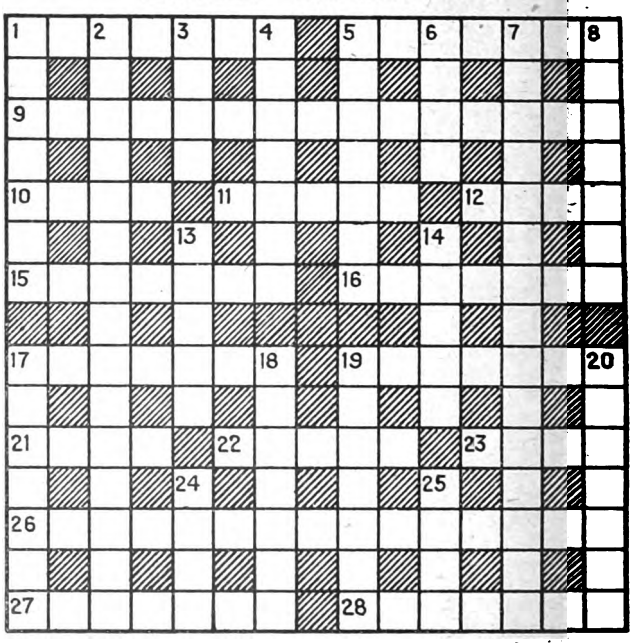
NINE-TENTHS of general practice today is the care of panel patients and their dependants; but in a pleasant chatty book[1] Dr. E. A. Barton recalls the conduct of medicine in the spacious manner now passing away—of general practice limited to the well-to-do in an exclusive neighbourhood. Perhaps this is the very reason why it makes such good reading either for the doctor or the layman: we rub elbows with great men and women of the past and we are not introduced to any social problems of the present. That Dr. Barton is a man of great age is evident; he was a fellow student of Rose Bradford and he once went to a dance in Hampton Court seated on the knees of his aunt in a sedan chair. But his chapter on quacks will be of value to the contemporary layman, and that on medical etiquette to the medical profession. And in connexion with etiquette he tells a story—proving that though medicine and practice alter human nature remains the same—about a man of highly strung neurotic temperament, who explained, with pantomime, that he endured the agonies of the damned in the abdomen. "His appetite was excellent, he snored like a trombone—so his suffering wife told me—eight hours every night without turning, but he suffered intensely. There was nothing very much wrong with him physically: but when a man is so ill as to think that he is ill when he is not ill, then he is very ill." This man Dr. Barton saved, not from the abdominal surgeon, but from an abdominal physician, a Dr. X who saw nothing but duodenal ulcer in every stomach-ache; for twenty years after this incident to the time of his death the patient "ate and drank anything, slept like the dead, but suffered intensely if anybody asked after his pains." But then Dr. Barton belongs to the days when it was considered the function of the doctor to protect not only the body, but also the pocket of his patient from the consultant who "conscientiously and seriously" thought as Dr. X did. With the development of investigations and operations. not to mention psychotherapy, the G.P.'s task is harder in this respect than it was forty years ago. This book will make an excellent New Year present to a doctor, his relations, acquaintances and patients.

TEAM OF TWO

BREAST-FEEDING is admitted to be an important process, whether from the viewpoint of nutrition or psychology. The psycho-analyst regards suckling as the child's first erotic experience and one which will leave traces later on his character and personality. Dr. Merrell P. Middlemore, whose work ceased with her untimely death, wrote her last book ("The Nursing Couple." London: Hamish Hamilton Medical Books. Pp. 191. 7*s.* 6*d.*) as an orthodox Freudian analyst, but its chief value may well lie in the detached observations of breast feeding which it records and in her original comments. Careful observations of the behaviour of the suckling are scarce, as Dr. Edward Glover points out in his foreword. Dr. Middlemore was fortunate in having the chance to carry out her study in the lying-in wards of a general hospital, and though this environment does not capture the atmosphere of the home it at least ensures that breast-feeding is conducted favourably from the nutritional point of view, and thus cuts down psychological factors arising from faulty technique in feeding. She watched an unselected group of mothers and infants during feeding, making no attempt at statistical study but recording clinical facts; and found that there are trends in feeding behaviour which occur irrespective of the success or failure of the mother to give adequate nourishment. She distinguished between satisfied and unsatisfied sucklings, regarding as satisfied those who sucked steadily by the fourth day of life and took 2–3 oz. at most feeds. Those who were unsatisfied she grouped as "excited ineffective sucklings" and "inert sucklings"; the inert group were further subdivided into the "simply inert" and the "irritably inert." Excited ineffective sucklings were fussy, either taking the nipple but failing to hold it, or refusing it repeatedly for days, or changing their behaviour at every feed. Sucklings who were simply inert were lazy from the start and failed to suck for some days; the irritably inert began actively but with many capricious tricks and became drowsy after three or four days, showing a progressive distaste for the breast, which had obviously failed to satisfy them. Recovery from such inertia might take place at a single satisfying feed, or only gradually, as the child began to take pleasure in feeding. Dr. Middlemore speculated on the causes of irritable inertia; it might, of course, derive from a defect in the nervous arc of the sucking reflex, but is far more likely to develop from faulty conditioning. Clumsiness in putting the child to the breast, or rough handling, may associate sucking with discomfort in his mind. It is characteristic of this group of infants that when they pass from the restless to the inert stage they adopt a peculiar immobility which Dr. Middlemore likened to the defensive immobility of some hunted animals; it might, she thought, be an example of an instinctive fear reaction—in this case fear of rough handling—used inappropriately, so that it worked to the child's disadvantage. Further analysis of her cases, and other studies on the same lines, may throw as much light on feeding difficulties as on mental and psychological development.

1. A Doctor Remembers. E. A. Barton, M.R.C.S. London: Seeley, Service and Co. Pp. 287. 12*s.* 6*d.*

LANCET CROSSWORD



ACROSS

1. What the cell does during mitosis (7).
5. Deadly ace on it (7).
9. Does it show the mind at work? (15).
10. Where you are fed up by the Italians (4).
11. It takes a horse to make the opening move (5).
12. Give one and lose 45 (4).
15. The Man Behind the Lancet (7).
16. Oil a bat and show detachment (7).
17. Looks after lame ducks and is no lamer herself (7).
19. This is hard—as the man said who found it in his pants (7).
21. A hundred more would make a bed for a consulting-room (7).
22. South of a Thames anchorage heard in the shelter (5).
23. Beheaded, where the boss put the typist; the whole, the result (4).
26. Teutonic version of a funereal diagnosis (two words, 8, 7).
27. "Eggs and Milk? Sauce!" said Lord Woolton (7).
28. "F" morsed disfigures (7).

DOWN

1. Home dairies (7)
2. Yeast in the wrong place (15).
3. A vestment helps one to contend (4).
4. Old Moore or Orion? (Two words, 4, 3).
5. The very reverse of polydipsia (7).
6. Bear with the French (4).
7. Wrapped in an — — of mystery, like the hero of an old melodrama (Two words, 12, 3).
8. Red head for blast (7).
13. This — averages to the statistician, and — income to the economist, but it just — — to me (5).
14. Physical training round the field brings all into the fold (5).
17. This movement is achieved by putting a false foot foremost (7).
18. New breaks the rush (7).
19. Was the candidate who just scraped through? (7).
20. Victorian physicians who were wore (7).
24. Add it to your list for a dreamer (4).
25. Back quickly (4).

The solution of the crossword will be given next week.

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ORIGINAL ARTICLES

BACTERIAL CONTAMINATION OF CEREBROSPINAL FLUID

WILSON SMITH,
M.D., DIP. BACT. MANC.
PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF SHEFFIELD

MURIEL M. SMITH,*
M.A. CAMB.

A SERIES of cases of meningitis in patients who had been subjected to spinal anæsthesia in the Sheffield Royal Hospital was reported by Barrie.[1] Routine bacteriological examinations of the cerebrospinal fluids, made throughout the epidemic, had proved negative except for three colonies of a gram-negative bacillus on one plate, and towards the end of the series one of us was asked to investigate the condition. In a note contributed to Barrie's paper, we reported that circumstantial evidence indicated a cold-water filter of the Berkefeld type as the probable source of infection. This filter supplied water in which the lumbar-puncture needles, which had been previously sterilised by treatment with formaldehyde, were rinsed before being used. The repeated isolation of a small, actively motile, gram-negative bacillus from samples of the water proved that the filter was faulty. The isolated organism was completely non-pathogenic for laboratory animals; furthermore agglutination tests with the sera of convalescent patients failed to yield any evidence that it was ætiologically related to the outbreak of meningitis. Nevertheless no further cases occurred after the filter had been put out of commission.

We were able to obtain samples of cerebrospinal fluid from only two of the later cases. At the time attempts to isolate an organism from them, by both cultural and animal inoculation methods, were unsuccessful. A spare portion of one of the specimens however was stored in the ice chest at about 4° C. and 16 days later was found to be slightly turbid from bacterial growth. Whether this organism was the causal agent in the series of meningitis cases could not be determined, largely because of its extreme instability in suspension which made satisfactory serological tests with convalescent sera impossible. The facts that it failed to grow on all the usual laboratory media except peptone water and peptone-water agar, and that temperatures above 30° C. completely inhibited its growth, make it much more likely that it was merely an accidental contaminant. Further study left no room for doubt that it was a water organism originally derived from the filtered water used for rinsing the lumbar-puncture needles. While not identical with the bacillus repeatedly isolated from the water it was a closely related strain or species possessing similar morphological and cultural characters and showing some degree of serological relationship. Both organisms were small actively motile gram-negative cocco-bacilli in young peptone-water cultures; they became non-motile and extremely pleomorphic in old cultures, they fermented none of the usual carbohydrates, reduced nitrates to nitrites and failed to produce indole. They could not be identified with any established species.

On inquiry we learnt that the practice of rinsing needles in sterilised water, either to cool them quickly or for some other purpose, is common in many hospitals. The results of the investigation of Barrie's cases indicated that this practice may not only lead to contamination of cerebrospinal fluid at the time of collection but may even constitute a serious danger to the patient. The present investigation was planned in order to determine the frequency with which specimens of cerebrospinal fluid, sent to the laboratory for examination, are contaminated with water-borne organisms which would be missed by the routine bacteriological methods usually relied on and to discover whether the presence of such organisms in cerebrospinal fluid is always attributable to the technique of lumbar puncture employed. It comprises the bacteriological examination of 223 cerebrospinal fluids and of a number of sterilised waters in current use at several different hospitals. Finally a few cerebrospinal fluids were examined which had been specially collected by techniques designed to avoid any possibility of contamination.

* Working with part-time grant from Medical Research Council.
1. Barrie, H. J. *Lancet*, 1941, 1, 242.

EXAMINATION OF CEREBROSPINAL FLUIDS

Methods.—Cultures were made from all specimens of cerebrospinal fluid received at the laboratory irrespective of the purpose for which they had been submitted. Quantities varying from 4 to 15 drops, according to the amount available, were seeded into duplicate tubes of Witte peptone water one of which was kept at room temperature and the other at 37° C. for 7 days. If either tube showed any opalescence or other sign of bacterial growth within this period stained films and dark-ground preparations were examined and subcultures made on fresh peptone water, digest broth, agar and blood-agar plates. The organisms isolated were investigated sufficiently to place them in one of the groups listed in table II; in many cases definite species identification was simple. No attempt was made to duplicate the tests carried out in the routine department. After sufficient fluid for the peptone-water cultures had been withdrawn specimens were passed on to that department for the examinations required by the clinicians; thus fluids sent in for Wassermann reaction or chemical tests only received no further cultural examination while those submitted for bacteriological diagnosis were cultured on agar and blood-agar plates and the remaining portion of fluid incubated, all at 37° C. and for not longer than 48 or 72 hours. It was no part of our intention to obtain the maximum percentage of positive cultures of all types of organisms by the employment of special culture media or improvements on the routine technique.

Results.—The results obtained by prolonged cultivation in peptone water at both room temperature and 37° C. are summarised and compared with those yielded by the routine tests in table I. While 154 specimens were examined by both methods an additional 69 were cultured in peptone water only. These latter were sent to the laboratory for Wassermann reaction or chemical tests only and were presumably from patients without signs of bacterial infection; their inclusion therefore weighted the chances of yielding positive cultures against the peptone water (P.W.) group in favour of the routine group. Nevertheless the percentages of C.S.F.s giving growth of organisms in the two groups showed no significant difference—43% in the P.W. group against 37% in the routine group. This was so in spite of the fact that meningococci or pneumococci were isolated by peptone-water cultures from only 8 of the 42 specimens which were shown by routine culture to contain these pathogens. If the organisms that were responsible for disease in the C.S.F. donors are excluded from consideration, the value of the P.W. technique is strikingly illustrated, 39·9% of fluids giving positive peptone-water cultures as compared with 9·7% giving positive routine cultures. There are several obvious reasons for this difference. The amount of cerebrospinal fluid inoculated into the peptone-water tubes was usually much greater

TABLE I—ISOLATION OF ORGANISMS FROM CEREBROSPINAL FLUIDS

Cerebrospinal fluids	Peptone-water culture	Routine culture at 37° C.
	No. and %	No. and %
Total examined	223*	154
Growth at—		
37° C. only	30	..
RT only	15	..
RT and 37° C.	52	..
Total giving growth	97 (43·5)	57 (37)
Organisms isolated—		
Pathogenic	8 (3·6)	42 (27·3)
Contaminant	89 (39·9)	15 (9·7)
Sterile	126 (56·5)	97 (63)
One species only isolated	89 (39·9)	54 (35·1)
More than one	8 (3·6)	3 (1·9)

* These included the 154 specimens also examined by routine culture. RT = Room temperature.

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than the amount spread over routine plates and P.W. cultures were incubated for 6–7 days instead of the routine 2–3 days. Moreover, it will be seen from table I that 15 specimens of C.S.F. contained bacteria which grew out in culture at room temperature but failed to grow at 37° C. It should be added that many more specimens contained organisms which preferred the lower temperature though capable of multiplying to some extent also at 37° C. The majority of contaminated C.S.F.s contained only one bacterial species but a few contained two or even three different species.

TABLE II—TYPES OF ORGANISMS ISOLATED FROM CEREBROSPINAL FLUIDS

Contaminant	PW culture at RT and 37° C. No. (223) and %	Routine culture at 37° C. only No. (154) and %
Water organisms—		
Unidentified species	23 } (14·8)	0
Ps. fluorescens	10 }	0
Staph. albus	33 (14·8)	8 (5·2)
Sarcinæ and *Micrococcus tetragenus* ..	9 (4)	1
Non-hæmolytic streptococci ..	4	1
Coliform organisms	11 (4·9)	4 (2·6)
Sporing aerobes	3	3
Proteus vulgaris	1	0
Diphtheroids	0	1
Yeast	1	0
Meningococci and pneumococci	8 (3·6)	42 (27·3)
Nil (specimens sterile)	126 (56·5)	97 (63)

PW = peptone water.

Table II shows the different types of organism isolated. The most striking feature is the frequency with which those organisms considered to be water-borne were isolated by P.W. culture (14·8%) and the complete failure of routine culture methods to reveal the presence of contaminants of this nature in any single instance. The water-borne organisms included *Pseudomonas fluorescens* and unidentified species belonging to that genus and to the groups *Chromobacterium* and *Achromobacterium*. Many of them showed some degree of serological relationship by cross-agglutination tests although quite distinct in their morphological and cultural characteristics. Three species were agglutinated by normal human sera to a titre of about 1 in 20; of 9 sera tested all gave the same result.

Apart from the water organisms the commonest contaminants were *Staphylococcus albus* (derived presumably from the skin of either patient or doctor), coliform bacilli and micrococci. Somewhat to our surprise these species also were isolated from a higher proportion of fluids by P.W. culture than by routine culture.

EXAMINATION OF HOSPITAL "STERILE" WATERS

On inquiry at four hospitals in and around Sheffield we learnt that in each of them cold sterilised water was used for rinsing spinal-puncture needles immediately before the operation. Different methods of water sterilisation were employed, not only in the different hospitals but in different units of the same hospital, the technique adopted in each case being traditional. In some instances the job was carried out in the wards by the nursing staff, in others by the hospital laboratory technician, in yet others by the dispensary pharmacist. In no unit was the destruction of all possible contaminants, including resistant spores, ensured by the method of autoclaving the water at increased pressure. Water once treated and labelled "sterile" was considered to be sterile until the bottle was empty, no matter how many withdrawals had been made or what time had elapsed since it had been first put into commission. In several cases the time interval between sterilisation and collection of our sample could not be ascertained; 7 days was the longest recorded.

Eleven samples were obtained, each being collected with a sterile pipette into a sterile test-tube and transported immediately to our laboratory for culture. The technique of peptone-water culture and subsequent investigation was the same as that used for the cerebrospinal fluids. The results obtained are summarised in table III. Six samples were found to be contaminated, the other five were apparently sterile though it is possible that some of them would have given growths had a variety of culture media been used. Contaminated specimens were obtained from all four hospitals. In hospital A, six specimens were taken from different blocks and two of them were found to be contaminated. It is significant that in each of these two cases a special note was made at the time of sampling that the bottle was already half empty.

TABLE III—ISOLATION OF ORGANISMS FROM HOSPITAL STERILISED WATERS

Specimen	Hospital	Growth	Characteristics of isolated organisms: Shape	Gram	Motility	Sugars	Indole	Litmus milk	Pigment	37° C.	RT	Water-sterilisation methods
1	A Block 1	−	..	..	..	..	..	..	..	..	..	Bottle kept for 3 hr. in bath of boiling water. Samples taken 3½ hr. after sterilisation.
2	A Block 3	+	CB	−	+	−	−	NC	−	+	++	Winchester in bath of boiling water. Most of contents already used at time of sampling 7 days after sterilisation.
3	A Block 4	−	..	..	..	..	..	..	..	..	..	Bottle kept for 1½ hr. in bath of boiling water. Samples taken 2 days after sterilisation.
4	A Block 9	+	CB	−	+	−	−	NC	Yellow	−	+	Winchester in bath of boiling water. Half contents already used at time of sampling 2 days after sterilisation.
5	A Block 9	−	..	..	..	..	..	..	..	..	..	Winchester in bath of boiling water. Unused before sampling 5 hrs. after sterilisation.
6	A Cas. dept.	−	..	..	..	..	..	..	..	..	..	Water filtered, then heated in steriliser to 200° C. Samples taken direct from steriliser.
7	B Ward 1	+	CB R	− −	+ −	− −	− −	NC Alk	− Orange	+ ++	++ +	Tap water boiled in kettle for 5 min.; then poured into a sterilised bottle. Bottle about half full when sampled.
8	B Ward 2	+	CB	−	+	−	−	NC	−	+	++	Ditto.
9	C	+	R	−	−	−	−	Alk	−	++	+	Autoclaved Winchester filled direct from a Stokes still. Bottle almost empty at time of sampling.
10	D	−	..	..	..	..	..	..	..	..	..	Jug sterilised in a boiler for 20 min. then filled from kettle and covered with jackonette. Full at time of sampling.
11	D	+	R	−	+	−	−	Alk	−	+	+	Glass-stoppered pot sterilised in boiler for 20 min. and filled from kettle. Half contents used at time of sampling 24 hr. after sterilisation.

CB = cocco-bacillary; R = rod-shaped; NC = no change; Alk = production of alkali.

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TABLE IV—BACTERIOLOGICAL EXAMINATION OF SPECIALLY COLLECTED CEREBROSPINAL FLUIDS

Specimen	Hospital	Result of culture	Technique of C.S.F. collection
1	A	Sterile	Needle and syringe autoclaved in plugged test-tube. Rubber gloves and mask worn by operator. Patient's skin washed with soap and water, swabbed with spirit and painted with 10% aqueous iodine. Local anæsthetic (2% procaine) injected with autoclaved needle and syringe.
2	,,	,,	
3	,,	Growth +; diphtheroid	
4	,,	Sterile	
5	,,	,,	
6	,,	,,	
7	B	Growth +; 2 different organisms identical with species isolated from sterilised water (no. 7, table III)	Routine technique. Needle rinsed in sterilised water (no. 7, table III) before use.
8	C	Growth +; organism identical with that isolated from sterilised water (no. 9, table III)	Needle kept in spirit, rinsed in sterilised water (no. 9, table III) before use.
9	,,	Sterile	Lumbar puncture performed in operating-theatre with full aseptic precautions. Local anæsthetic given. Needles and syringes sterilised by boiling at time of operation.
10	,,	,,	
11	,,	,,	
12	,,	,,	

All the organisms isolated were similar to some of those obtained from routine cerebrospinal fluids. They were all gram-negative bacilli or cocco-bacilli, indole-negative and fermenting no sugars, but they showed differences in respect of morphology, motility, production of alkali in litmus milk and formation of pigment. Direct proof of the transference of such bacteria from water to C.S.F. at the time of spinal puncture is afforded by the results from waters nos. 7 and 9 (table III) and C.S.F.s nos. 7 and 8 (table IV). These C.S.F.s were collected through needles which had been rinsed in the respective waters and identical organisms were isolated from the corresponding specimens. In the case of water 7 and C.S.F. 7 each specimen contained the same two quite different species.

EXAMINATION OF SPECIALLY COLLECTED CEREBROSPINAL FLUIDS

Of the 89 routine C.S.F. specimens contaminated with non-pathogenic bacteria, rather more than a third contained water-borne organisms and rather less than two-thirds organisms which were mostly derived from skin and clothing (tables I and II). It is clear therefore that the technique of C.S.F. collection in general and hospital practice is unsatisfactory quite apart from the use of so-called sterile water. A small number of specially collected specimens was examined to convince ourselves that sterile fluids can be obtained provided just a little extra trouble is taken. They were supplied from hospitals which had previously sent full quotas of contaminated C.S.F.s to the laboratory for bacteriological diagnosis. The special precautions adopted and the results of peptone-water culture are given in table IV. Two of the specimens (nos. 7 and 8) have already been discussed; they were collected by the old technique and examined in parallel with the waters (nos. 7 and 9, table III) used to rinse the puncture needles. From them the water contaminants were readily isolated. Apart from these one fluid only out of ten gave bacterial growth, the organism being a diphtheroid probably of skin derivation. The use of boiled or autoclaved needles and syringes led therefore, as was expected, to the complete elimination of water contaminants and the application of reasonable standards of cleanliness prevented other contamination except in one instance.

COMMENT

It is clear that spinal puncture is performed in many hospitals, and presumably in private practice also, in light-hearted fashion without the ordinary measures of asepsis which patients and laboratory workers have the right to expect. It is probable that this bad practice leads, as a rule, to nothing more serious than the contamination of specimens withdrawn for laboratory tests, but the possibility of operative infection of the meninges is obvious. This danger is, of course, greatly increased when material such as anæsthetic fluid is injected into the spinal canal.

The practice of using previously sterilised or filtered water for rinsing syringes and needles cannot be too strongly condemned, for it is entirely unnecessary and the contamination of stock water bottles appears to be the rule rather than the exception. The contaminants are mostly species which are usually considered non-pathogenic, but the outbreak of meningitis reported by Barrie strongly suggests that potential pathogens may sometimes be present. The possibility of the transference of infective viruses, like the virus of lymphocytic choriomeningitis, in filtered water, though remote, also merits consideration. The adoption of simple boiling, or better still either oven sterilisation or autoclaving in plugged test-tubes, for the sterilisation of needles and syringes would at once reduce the number of contaminations by over a third and eliminate one of the chief sources of potential infection.

SUMMARY

Of 223 unselected specimens of cerebrospinal fluid 89, or 39·9%, were shown to be contaminated with non-pathogenic organisms by cultivation in simple peptone water at both room temperature and 37° C. Bacteriological examinations of 154 of the same specimens by routine methods revealed contaminants in only 15 or 9·7%.

The peptone-water technique was superior to routine culture for the isolation of almost all types of non-pathogenic bacteria and was essential for the demonstration of water organisms, which accounted for 37% of the contaminants.

Many sterilised waters used in different hospitals for rinsing spinal puncture needles and syringes were found to be contaminated.

Direct evidence was obtained that bacteria may be transferred from such water to cerebrospinal fluid at the time of operation.

Of 10 cerebrospinal fluids collected with reasonable aseptic precautions 9 were bacteriologically sterile and 1 was contaminated with a diphtheroid.

We are indebted to Mr. J. Hardman, Dr. K. J. G. Milne and Dr. H. J. Barrie for their help in the collection of material.

TREATMENT OF AIR-RAID CASUALTIES*

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THE publication of every experience in the reception and treatment of air-raid casualties is of great importance. It is by the pooling and collection of all results, and even impressions, that many gaps in our knowledge will be filled. At a Service hospital there has been a special opportunity for testing planned resuscitation and operative schemes.

RECEPTION AND RESUSCITATION

It was found best to admit patients into resuscitation wards irrespective of their condition, and then filter them through into the operating-theatres or other wards. Patients who were obviously severely wounded were placed in beds on one side of the ward so that they could be examined first. When the first resuscitation ward was full admission was diverted to the second. The patients were placed between warmed blankets and the clothing completely taken off in every case. It was found that delay in taking off clothing results in important injuries being missed, and the thick, often damp clothing cannot be penetrated adequately even by heat from shock cages. Only one examining team was utilised to prevent overlap and confusion, and they moved round the ward methodically examining the cases in strict rotation. A list for operation was made at an early stage, and this enabled the operating-tables to be fed within an hour of receipt

*A more detailed account of these casualties appeared in the *Journal of the Royal Naval Medical Service* for October, 1941, p. 330.

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of the casualties. This operating list was of course subject to frequent revision, but unless it was begun early it was inevitable that it would prove difficult to deal with patients in the "safe period." We were impressed with the necessity for examining the whole body from top to toe and it was astonishing how small but serious wounds could otherwise be missed. The best and simplest method of recording injuries was under anatomical regional headings such as head, arms, chest, abdomen, legs and spine.

The average degree of shock encountered in air-raid casualties far exceeded that seen in the casualties of civil life. The nature of the injuries and the state of the blood-pressure were the best signs of its gravity. Early rapid resuscitative measures were strongly advisable. Severe shock had to be tackled whole-heartedly. Besides heat, elevation of the foot of the bed on 18 in. blocks, and intravenous therapy with blood, plasma or reconstituted serum in large doses were necessary. A cannula was always inserted into a vein in cases requiring intensive anti-shock treatment over a long period.

Seriously shocked cases must be given plasma in quantity and given it quickly. It should be possible to run in two pints of plasma in 20 minutes and further quantities up to six pints at rather slower rates as the patient's condition improves. The blood-pressure is usually the best guide to the success or otherwise of plasma- or blood-transfusions. If the systolic pressure does not rise with three pints given quickly it is unlikely that the patient will recover. Patients have been seen with systolic pressures below 50 mm. Hg and have improved at the rate of 10 mm. Hg for each pint of plasma or blood given. It is useful to maintain a sphygmomanometer cuff on the patient's arm throughout treatment and easy to train the ward staff to take the systolic pressure accurately. In certain cases admitted early after injury the blood-pressure was either maintained or raised for a variable period. In such cases the type and degree of injury led one to suspect that a fall was imminent and this could be prevented if plasma was given to compensate for the fall in circulating blood-volume. Oxygen therapy with the B.L.B. mask was frequently used and with obvious immediate improvement in colour, pulse, and depth of respirations. If the patient did not tolerate the mask it usually meant that he did not require oxygen. Many patients asked for it to be reapplied if it was removed. Instruction in the use of the mask had been part of the regular training of the ward staff. Among other adjuncts to the treatment of wound shock are the intelligent temporary splinting of fractures, especially those of the femur; the utilisation of early skeletal traction under local anæsthesia in the ward; and the local blocking of injured limbs with 1% procaine.

Resuscitation measures are only temporary in their effect in most of these cases. Where operation is delayed a patient may reach a peak of improvement and then relapse despite all further resuscitative measures. Patients must if possible be operated on when on the up grade. Approximately 70% of the cases given intense preliminary resuscitation survived operation.

CASES ANALYSED

	Total	Died
Head injuries	35	4
Chest injuries	3	2
Abdominal injuries	8	8
Compound fractures	22	5
Simple fractures	34	0
Bomb splinter wounds of soft tissue	37	0
Laceration of soft tissues	7	0
Burns	8	0
Eye injuries	4	1
Minor injuries	71	0
Unclassified	16	4
Total	245	24

A consecutive series of 245 air-raid casualties aged 20–50 years, most of whom had previously been healthy, are analysed here. Nearly all were admitted within 1–3 hours of the injuries, and all patients admitted alive into the reception wards are included. The death-rates have been calculated up to a period of a week from the day of injury. The total fatality-rate was 10%.

Head injuries include scalp lacerations, concussion and closed or compound fractures of the skull. Altogether there were 35 cases (14% of all cases), 9 being scalp injuries and 12 suffering from concussion. The fatality-rate was 11%. The diagnosis of these head injuries was simple in some cases but in many with other multiple severe injuries the degree of shock made it difficult to assess the cerebral lesion. Accurate neurological examination was often impossible in the early stages of examination. It was made the rule to take every scalp laceration to the theatre for thorough exploration and toilet of the wound. Most of the compound injuries of the skull were due to falling debris, and it should be more widely realised that steel helmets are as useful indoors as out. There were 8 cases of compound depressed fracture of the skull, and 6 were fit for operation, all of which recovered.

Abdominal injuries.—These made a depressing series; there were 8 cases (3% of the total), of which only 4 reached the operating-table and all subsequently died; 3 of these had hopeless lacerations of the abdominal contents and died immediately or soon after abdominal closure. In one case, where the liver had been injured by a bomb splinter, the patient died a few days after operation from a pneumonic infection and a small subhepatic bile-stained abscess.

Chest injuries.—Of the 3 patients admitted with chest injuries 2 were quite inoperable and died shortly after admission. Both these patients had multiple bomb-splinter penetrating wounds with other compound injuries. The one patient who was successfully operated on received a small bomb-splinter wound in his left lower chest and the fragment actually lodged in the right side of the chest. The only operative interference was excision of the entry wound. He subsequently developed a hæmothorax on the right side which was treated by aspiration.

Compound limb injuries and soft-tissue lacerations.—These 65 cases made up 26% of the total. The value of the closed-plaster method was confirmed. Among its other advantages it enabled amputation cases and others to be rapidly transferred to base hospitals. This was found to be particularly important from the patients' point of view, for with the prospects of further nightly raids they were apt to be nervous or sleepless. The wounds were widely and thoroughly excised, sutures were avoided wherever possible, and the wounds packed with Vaseline gauze. By adopting the pattern technique for plastering the limbs much time was saved. A hip spica could be applied in 8 minutes. All cases were examined radiologically before operation; in this way the presence of metal fragments was confirmed and their type and localisation noted, so that the scope of the operation required for excision of the track could be assessed. The small penetrating wounds of fascia with gross damage of underlying muscle were a real danger unless adequately treated. Complete plaster immobilisation was an essential in soft-tissue limb injuries as in compound fractures.

There were 36 cases (14% of all cases) of bomb-splinter wounds of soft tissues, 15 of them involving either the buttock or thigh. The high incidence of such wounds is presumably due to the prominence of the buttocks when people throw themselves down for protection. There were no deaths in the soft-tissue injuries, which included 2 cases of severe local gas-gangrene infections; these recovered after wide local drainage, serum and early immobilisation in closed plaster. There were an additional 7 cases of lacerations due to glass. It was found safe to employ primary suture for these inside 12 hours.

There were 22 compound fractures of the limbs and 8 of these required amputations; 2 patients requiring upper-limb amputation recovered, but 4 out of the 6 patients whose lower limbs were amputated (2 double amputations) died. Subsequent renal failure, with a probable associated cerebral lesion, was responsible for 2 of these deaths. Of the remaining 14 compound fractures, including 4 of the femur, all recovered except one patient with aortic incompetence who collapsed and died suddenly 24 hours after the injury. Of special interest was a case of compound injury to the humerus

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in which an acute Volkmann's ischæmic contracture, with all the typical signs, developed 12 hours later. The brachial artery was explored and found to be contracted to a diameter of about ⅛ in. in its entire extent. Peri-arterial sympathectomy and excision of an arterial segment failed to relieve the arterial spasm. Both legs had to be amputated for crush injuries in this case and the patient collapsed and died shortly after the operation.

Simple fractures.—These 34 cases (14% of the total) illustrate the great importance of a specialised knowledge of the treatment of fractures in air-raid cases. The upper and lower limbs received an equal proportion of injuries. A patient with a dislocation of both hip-joints and multiple pelvic fractures was admitted with severe shock (systolic blood-pressure unrecordable) after a heavy mass of concrete had fallen on his sacral region while he was bending down. After resuscitation with 3 pints of plasma, and early skeletal traction through the tibial crests, he recovered.

Burns.—With certain exceptions burns were treated successfully with tannic acid 5% and silver nitrate 10%. This produces a rapid coagulum, an important point when many cases have to be treated. Certain areas were never tanned—the eyelids, lips, genitalia, ears and fingers. Burns of the fingers were treated on light plaster splints in the position of function with Ambrine wax applied on strips of gauze. This method has given excellent healing and good functional results where the initial injury was not too severe. The bad results attributed to tanning methods are more likely due to the initial damage by the burn. The ambrine wax method is, however, much more comfortable, and indeed has been applied to other areas.

Eye injuries.—There were only 4 cases of eye injury and in 2 of these the damage was due to metallic splinters, for which the affected eyes had to be removed. Multiple fine corneal foreign bodies and corneal abrasions accounted for the other 2 cases.

Minor and unclassified injuries.—There were 71 cases of minor injury (29% of the total), most of them having minor lacerations, sprains or slight shock. Many required X-ray examination. In the unclassified list are included 16 patients (7% of the total), several of whom had multiple injuries or had been buried for some time. There were 2 who developed all the signs of a crush-syndrome lesion of the lower limb and recovered, and 4 cases of blast lung, 2 of which were diagnosed by X ray. A stout bronchitic man, with no other lesion except a fractured radius, died after a hæmoptysis which suggested a blast lesion. Included in this unclassified list are 3 patients with multiple bone injuries to the trunk who died shortly after admission.

There were 2 cases of spinal-canal injury. Both were explored and the missiles removed. The one recovered fully but in the other there was damage to the cord with paraplegia.

COMMENT

Antitetanic serum was given as a routine in all wounds including burns; no case of tetanus occurred. Patients with muscle damage were given 8000 units of anti-gas-gangrene serum. No definite conclusions have been reached on the practical value of chemotherapy either generally or locally. During actual convalescence, after the study of a number of blood-counts in a series of cases, it was found that fresh blood-transfusion is of great value in the post-operative period. The importance of close observation of urinary output and renal efficiency must be particularly stressed to the nursing staff, especially in amputation cases and crush injuries. Post-mortem examinations wherever possible are desirable, but owing to administrative difficulties in obtaining the necessary permission much material is being lost.

SUMMARY

In a series of 245 air-raid casualties the mortality was 10%. The use of intensive resuscitation measures was shown to be fully justified in severe cases of injury, and a planned system of resuscitation and treatment is advocated.

Dr. Herbert Spencer, who left an estate of £46,000, bequeathed £3000 to University College Hospital, £3000 to the Medical Society of London, and a residue to the Royal Medical Benevolent Fund.

VITAMIN A AND DARK-ADAPTATION
EFFECT OF ALCOHOL, BENZEDRINE AND VITAMIN C

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THE relation between vitamin A and dark-adaptation depends on three known facts. First, vitamin A is a constituent part of the photosensitive pigment of the rods and possibly also of the cones (Wald 1935, Hecht 1940). Secondly, most cases of night-blindness are cured with vitamin A (Hecht and Mandelbaum 1939, Lewis and Haig 1940, Edmund and Clemmesen 1936). Thirdly, night-blindness can be produced by feeding on a diet deficient in vitamin A (Wald et al. 1938, Booher et al. 1939). All relevant investigations are based on one or more of these facts. Many of the workers who have argued as to their truth have used inaccurate methods of testing dark-adaptation, either of the "recovery-time" type or a similar method (see Dow and Steven 1941 for detailed criticism of these methods). The present study was undertaken in the hope of throwing further light on some aspects of the subject.

Methods.—Dark-adaptation was measured by the apparatus and method described by Yudkin (1941a). The initial part of the curve was obtained by using no neutral screen for the first few minutes. The vitamin-A content of the blood was estimated by the method described earlier (Yudkin 1941b).

The significance of changes in the dark-adaptation curve and the blood vitamin A following any treatment must be considered in the light of their normal variation.

The final rod threshold tested as described on any one subject varied by about 0·2 log unit from day to day, by about 0·1 log unit in a shorter period of a few hours and hardly at all during an hour. The cone threshold, owing partly to the absence of a "fixation spot" in the instrument, varied more than this—i.e., about 0·3 log unit from day to day and about 0·2 log unit over a short period. The rod-cone transition time varied up to about 2 min. from day to day but less than 1 min. on any one day. These variations are not apparently related to fatigue or practice (personal observation) but may be related to changes in the blood-sugar (McFarland and Forbes 1940). Only differences greater than those described can be considered significant in any one case. If, however, there are significant changes in several subjects after a particular treatment this increases the importance of smaller changes in other subjects if they are all in the same direction. Also, if several control tests have been made with any one individual, any change from these may be significant even if less than the normal range of variation. It is worth noting that although the final rod threshold varies in any individual by 0·2 log unit, the total variation among normal people was found to be 0·3 log unit (for definition of "normal" see Yudkin 1941a). It is possible, therefore, for the values for the final rod threshold of an individual to lie in the upper part of the normal (total) range of variation and yet show a significant lowering after vitamin-A therapy.

The resting level of vitamin A in the blood varies by about ± 5% over periods of days or weeks, and it is not affected by food unless this is very rich in vitamin A. These changes may be due to different degrees of adrenal cortical (Malméjac, Chevallier and Choron 1935) or medullary (Thiele and Guzinski 1940) stimulation.

These variations in blood vitamin A and dark-adaptation are quite independent and may be in opposite directions, so that a lower level of blood vitamin A may be associated with a better dark-adaptation curve and vice versa.

EFFECT OF VITAMIN A ON SUBJECTS WITH POOR DARK-ADAPTATION

Effect of a single dose.—Single doses of about 100,000 I.U. of vitamin-A alcohol in gelatin capsules containing 25,000 I.U. each were given on an empty stomach. The effect on the dark-adaptation curve was followed during the next 24–36 hours, or longer if the effect was prolonged, food being taken after 3 hours. The dark-adaptation was measured at 1, 4, 7, 10 and 24

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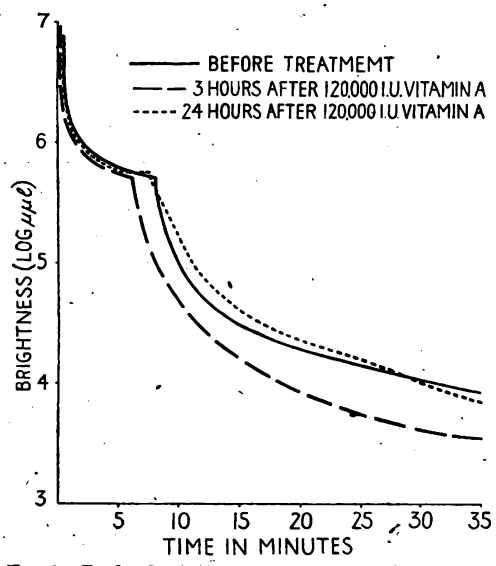

FIG. 1—Dark-adaptation curve in a severely deficient subject.

hours. The results obtained varied in different subjects. Most commonly there was an improvement in dark-adaptation which began in about 2 hours and was maximal in about 8 to 10 hours. By 24 hours the curve had returned to the original state. This transitory improvement was sometimes sufficient to bring the curve of a severely abnormal subject to within normal limits (fig. 1). The final rod threshold, the final cone threshold and the rod-cone transition time were usually all affected.

In one case out of the 24 tested the change was much more rapid, the maximum effect occurring within 2 hours. This recalls the statement by Wald and others (1938) that the effect of a single dose of vitamin A was noticeable in about 30 min. and maximal in 150 min. The difference in rate of response in hemeralopic cases may lie in the different rates at which vitamin A is made available to the retina or in the actual degree of vitamin-A deficiency.

The vitamin A used in these experiments was in the form of the alcohol. Two cases were tested after a dose of a preparation containing mostly esters and the response was no quicker. This was not unexpected in view of the probability that the esters are changed into the alcohol before absorption (Gray, Morgareidge and Cawley 1940).

Although the type of response noted above was the usual one, there were others common enough to be important. The effect was sometimes even more transient than that described, an improvement being found only once in the 24 hours; in other subjects there was no response at any time in the 24 hours. On the other hand in some the improvement was much more

TABLE I—DOSE REQUIRED TO PRODUCE PROLONGED CURE OF NIGHT-BLINDNESS

Subject	Original threshold (log μμl)	Dose of vitamin A required (I.U.)	Final threshold after cure (log μμl)
1	3·72	650,000	3·42
2	4·11	300,000	3·54
3	3·84	250,000	3·54
4	3·84	1,000,000	3·54
5	4·24	1,600,000	3·54
6	3·72	270,000	3·42
7	3·93	700,000	3·54
8	3·93	2,000,000	3·54

prolonged, the return to the hemeralopic state taking several days or even weeks instead of the usual 24 hours.

Effect of repeated doses.—Although the different types of response described above were obtained on different subjects, they could all be seen on any single very deficient subject tested after each of several doses (fig. 2). Such a case showed no effect at all after the first two or three doses of 100,000 I.U., then a very transitory reaction was seen. After a few more doses there was the usual improvement and relapse in 24 hours. After still more doses of vitamin A the return to the hemeralopic state took 3–4 days. At this stage a much smaller dose produced a result. With further doses the response to a single large dose lasted a considerable time (weeks or even months).

These results are of particular interest in that each of them has been obtained by different investigators. Thus Hecht and Mandelbaum (1939) found no change in tests done over a period of one day after a dose of vitamin A. More recently they (1940) have found transient responses lasting less than one day. Wald and Steven (1939) showed that an effect occurred bringing a case within normal limits in one day in an experimental deficiency and Lewis and Haig (1940) obtained a response lasting up to 20 days. In view of the results described here, the findings of these workers are not mutually contradictory. The variable response also throws some light on the irregular results obtained by workers who have given comparatively small doses of vitamin A (say 10,000–20,000 I.U. daily) for 3–4 weeks and have tested the cases before and after this. Apart from the use of inaccurate instruments the results may have varied according to how nearly cured the cases were after treatment. Those nearly cured and tested within 24 hours of the last dose would show some improvement, while those still badly deficient or tested more than 24 hours after the last dose might easily show no response.

Tests for deficiency.—We may now discuss what tests should be used to decide whether a case of clinical night-blindness is due to deficiency of vitamin A. Steven and Wald (1941) use the criterion of "threshold lability"—i.e., the fall from a high to a significantly lower final rod threshold after treatment with vitamin A. Theirs is the best test so far, but they do not state the doses used. In view of the facts described above, the test may be improved as follows.

A preliminary dark-adaptation curve is done before any treatment. Large doses (e.g. 100,000 I.U.) of vitamin A are given daily for 10 days and a dark-adaptation test is done 24

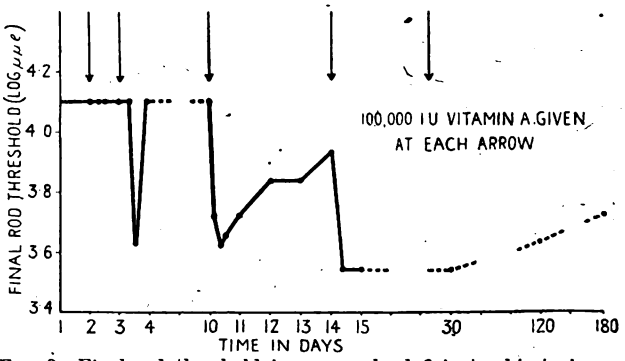

FIG. 2—Final rod threshold in a severely deficient subject given repeated doses of vitamin A.

hours after the last dose. (An estimation of blood vitamin A on a sample taken about 4–5 hours after any dose would show whether the vitamin was being absorbed.) Most subjects with poor dark-adaptation due to vitamin-A deficiency will by this time respond to a single dose by an improvement lasting more than 24 hours and would therefore show a significant improvement in the dark-adaptation curve. If no response is shown after this dosage another single dose is given and dark-adaptation tests done at intervals throughout the next 24 hours. Subjects with night-blindness due to vitamin-A deficiency would almost certainly show at least a transient improvement at this stage and it could be assumed that no response means that the night-blindness is not due to vitamin-A deficiency. If circumstances permit a test should be done 24 hours after each dose. This would show the first time a response lasted more than 24 hours and so give some idea of the amount of vitamin A required to cause improvement.

Of 24 subjects with night-blindness tested by this or similar means all except 3 were improved. Of these 3, 1 showed pathological dilatation of the pupil, another had well-marked diabetic retinitis, and the third had congenital and hereditary night-blindness. Most of the hemeralopic subjects were over 40 years old but apart from the 3 cases mentioned all the dark-adaptation curves could be brought to within normal limits.

Extent of hemeralopia and dose of vitamin A needed for cure.—There was no relation between the degree of night-blindness and the dose required to produce a

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prolonged cure. Some subjects with a very high threshold required 300,000–400,000 I.U. while some with only slight hemeralopia required up to 2,000,000 I.U. (table 1). This may have been due to differences in any of the stages in the metabolism of vitamin A from absorption to the transformation in the retina, or to the possible adaptation of the retina to a low level of available vitamin A over a long period.

BLOOD VITAMIN A AND DARK-ADAPTATION

There are two problems in regard to the relationship between blood vitamin A and dark-adaptation—the general relationship in different individuals, and the relationship in single subjects.

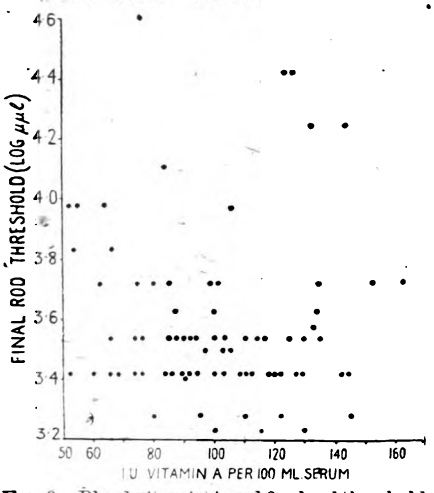

FIG. 3—Blood vitamin A and final rod threshold in 75 subjects.

General relationship in different individuals.—Lindquist (1938) states that when the blood vitamin A is less than 70 I.U. per 100 ml. of serum there is almost always some degree of night-blindness but above this level there is no relationship. Baum and McCoord (1940) on the other hand found no relationship in children. In a group of 75 cases investigated here there was no general relationship. Some of the subjects with less than 70 I.U. per 100 ml. serum had high final rod thresholds (fig. 3) but it is not possible to state definitely that three is a level of blood vitamin A above which all subjects will certainly have a normal threshold and below which they will not. Similarly there is no relationship between the level of blood carotene and the threshold, or between the sum of carotene and vitamin-A content of the blood and the threshold.

Relationship in a single subject.—The results of Pett and Le Page (1940) and Steininger, Roberts and Brenner (1939) in this connexion are difficult to interpret, because both groups of investigators used methods open to criticism. There are two ways of studying the problem: either by following the changes in dark-adaptation and blood vitamin when the diet is deficient in vitamin A, or by testing dark-adaptation and blood vitamin A during dosing with vitamin A. In this work a study of the second type has been made in several cases. The results obtained appear to be of three types, depending on whether the subject was much deficient, slightly deficient or normal. In the first group the vitamin-A content of the blood showed a rapid rise to 400 or more I.U. per 100 ml. serum and a fall to the previous low level by 24–36 hours. The dark-adaptation test of these subjects might or might not show a transient improvement. When an improvement was observed it always occurred later than the maximum rise in the blood vitamin A. In normal subjects there was a similar rapid rise and a fall to the original value in 24–36 hours. With these cases there was, of course, no change in the dark-adaptation curve. The most interesting response, however, was that observed in a partially cured subject.

This patient, originally much deficient, was given several doses of vitamin A and the blood vitamin A and the dark-adaptation studied after each dose. As with other very deficient subjects the blood vitamin A rose rapidly to about 400 I.U. per 100 ml. serum after 5 hours and returned to its original level in about 24 hours after the first three doses. The dark-adaptation showed a transient improvement. The fourth dose produced a more prolonged effect. There was presumably the usual rapid rise of blood vitamin A to a very high level a few hours after dosing; the subsequent fall, however, did not bring it quite to its original low value in 24 hours. The fall continued so that the original value was reached 2 days later. The final rod threshold showed a correspondingly prolonged improvement. Further dosing similarly produced a more lasting effect on both blood vitamin A and the final threshold (fig. 4).

It seems that when the deficiency of vitamin A is partially rectified a dose of the vitamin produces a two-fold change in the level of blood vitamin A. The first is a "flushing" effect—a rapid and considerable rise and fall. After this there is a slower fall which may continue until it reaches its original level.

The results in this case indicate that the improvement in the final rod threshold, though always associated with a rise in blood vitamin A, is related more quantitatively to this less transient level of the blood vitamin (fig. 4). It appears likely, moreover, that a continuation of the dosing would result in a progressively increasing delay in the return of the blood vitamin A and final rod threshold to their original levels. Eventually, with the subject completely cured, this second, slower fall would be delayed indefinitely, as he now shows the type of response which occurs in the normal person. It seems, therefore, that in any subject there is a critical level of blood vitamin A below which there is a subnormal rod threshold; and the lower the level of vitamin A in the blood below this critical level, the higher is the final rod threshold within the limits of the normal independent variations of the two. On the other hand, a blood vitamin A higher than the critical level does not affect this threshold.

EFFECT OF ALCOHOL AND BENZEDRINE ON DARK-ADAPTATION

There seems to be a widespread belief that alcohol improves dark-adaptation, though the literature on the subject seems to be limited to two statements. The first is the result of experiments by Clausen and others (1940) on dogs which showed a rise in blood vitamin A after the administration of alcohol.* The second is the statement of Pett (1940) that after an evening of alcoholic excess many people showed abnormally quick recovery times

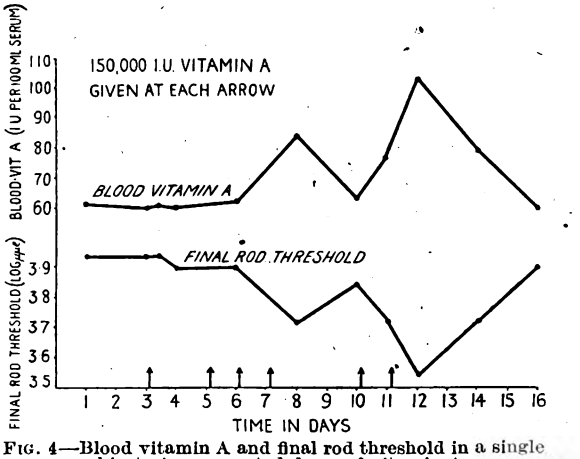

FIG. 4—Blood vitamin A and final rod threshold in a single subject given repeated doses of vitamin A.

on his apparatus. There appears to be no reference to the effect of benzedrine.

The effect of these substances were investigated as follows. Several subjects, some with a high rod threshold, were tested together. The final rod threshold was tested after 25–30 min. in complete darkness (Wald et al. 1938, Yudkin 1941a), continuing if necessary until the threshold was constant. The substance to be tested was then administered and the threshold tested at quarter-hourly intervals afterwards (figs. 5 and 6). The final cone threshold, the rod-cone transition time and the rate of adaptation were then tested together. Having discovered the period during which the substance had most effect on the final threshold, it was given to single cases and a complete dark-adaptation curve carried out at a time that was estimated to bring the whole curve into the period of maximum effect. A normal curve was also done on each case, if possible on the same day, before the test. It was usually impossible to test any particular part of the curve

* Clausen, S. W. and others (*Science*, 1941, **93**, 21) have recently claimed a similar result in humans.

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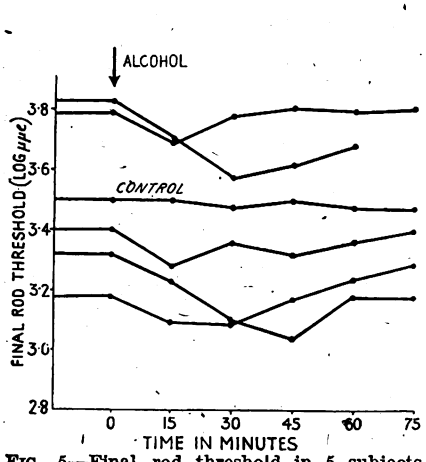

FIG. 5—Final rod threshold in 5 subjects given 20 ml. alcohol and in a control without alcohol.

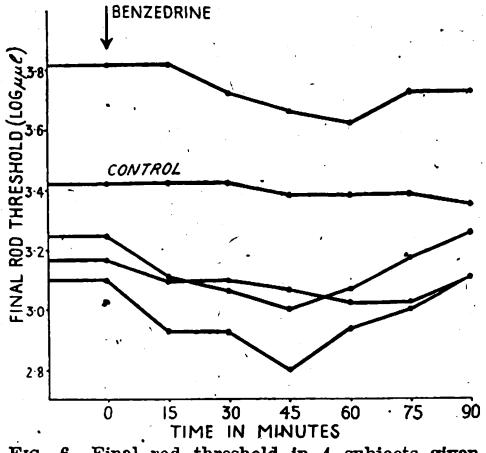

FIG. 6—Final rod threshold in 4 subjects given 10 mg. of benzedrine and in a control without benzedrine.

more accurately than this, for the reaction did not always occur at a definite fixed time. The effect on blood vitamin A was determined by estimating a sample taken before and at the probable time of maximum effect after the substance was given.

Alcohol.—The dose of alcohol used was 20 ml. in the form of 100 ml. sherry. Preliminary testing showed that there was no difference in the reaction whether pure diluted alcohol or sherry was used, so that the more pleasant vehicle was given. The effect of the final rod threshold in five cases is shown in fig. 5. It is seen that there is a definite improvement in each case even when the original threshold was very low. The change begins almost immediately and continues for about an hour.

The effect on the rest of the curve is shown in table II. The alcohol was given half an hour before the test was started. It is seen that the part of the curve showing most change was not always the same, the divergence probably depending on differences in the time of maximum effect of the alcohol. Although the changes were not always significant, even the smaller improvements were in the same direction and there was no curve which was worse after the alcohol. Three cases (12, 13, 14a) showed no effect in any part of the curve by this test. In one of these (14a) the alcohol was given on another occasion immediately before the test, and a significant change occurred in the first part of the curve but passed off in about 20 min. (14b). The other two cases may have shown no response for a similar reason.

There was no significant change in the blood vitamin A in any case. The results varied in both directions and always within normal limits. To emphasise this point—that the improvement does not depend on a concomitant rise in blood vitamin A—two subjects whose normal variations were in the upper part of the normal distribution curve were given 120,000 I.U. of vitamin A and tested at intervals thereafter. There was no definite change in any part of the curves, though the blood vitamin A rose to more than 500 I.U. per 100 ml. serum. These same two subjects showed a significant effect with alcohol.

Benzedrine (*amphetamine sulphate*).—The dose used was 5 or 10 mg. on an empty stomach, given half an hour before the test. The effect on the final rod threshold is shown in fig. 6, and the rest of the curve in table III. Again the parts of the curve most affected varied in different subjects. Only one of the subjects tested (9) showed no effect in any part of the curve. The blood vitamin A, as with alcohol, showed no significant change. The two subjects who showed no improvement with vitamin A but reacted to alcohol also responded to benzedrine. The effect seemed to be wearing off after an hour and a half. The mental effect was greatest several hours later but two subjects tested at this period showed no change in dark-adaptation.

VITAMIN C AND DARK-ADAPTATION

It has been said (Stewart 1941, Kimble and Gordon 1939) that vitamin C may produce an improvement in dark-adaptation. According to Stewart, who gave 150 mg. daily for 7 or 14 days, the effect was sometimes seen in subjects resistant to vitamin A therapy, while in other subjects it was superimposed on a partial improvement produced by vitamin A. It is not stated whether these subjects were deficient in vitamin C as shown, for example, by "saturation" tests. In the present work no such effect of vitamin C has been observed in any subject. Six subjects with poor dark-adaptation were given 500 mg. vitamin C daily for 10 days. In none of these was any improvement noted whereas all subsequently became normal with vitamin A. Five subjects with normal curves in the upper part of the normal variability curve also showed no improvement with this dose. In another subject with severe night-blindness the excretion of vitamin C was followed during dosing. He was found to be decidedly "unsaturated," requiring 8 days' dosing (total 4000 mg. vitamin C) before the urinary excretion rose significantly. At the end of this time the dark-adaptation curve had not altered. Further dosing for 14 days with 100 mg. daily was also without effect. The subject was then given a total of 900,000 I.U. of vitamin A over a period of 14 days, at the end of which his dark-adaptation curve was normal. Further investigation of the effect of vitamin C is needed.

DISCUSSION

It is not to be expected that vitamin A is the only factor affecting dark-adaptation. In a process so complicated, and involving not only the photochemical changes in the retina but the transmission of nerve impulses and the interpretation of these in the cortex, it is obvious that any link in the chain may be affected. Thus lack of oxygen and hypoglycæmia (McFarland and Forbes 1940) as well as benzedrine and alcohol all produce a change in dark-adaptation, the latter improvement, the former deterioration. As we have seen, benzedrine and alcohol produce their effect without any corresponding change in the vitamin A of the blood. The fact that,

TABLE II—EFFECT OF 20 C.CM. OF ALCOHOL ON DARK-ADAPTATION

Case	Final cone threshold (log μμl)			Rod-cone transition time (min.)			Final rod threshold (log μμl)		
	Before	After	Improvement	Before	After	Improvement	Before	After	Improvement
1	5·7	5·7	0	8	5	3	3·63	3·42	0·21
2	5·85	5·7	0·15	5½	5½	0	3·23	3·23	0
3	5·7	5·65	0·05	7½	5½	2	3·54	3·42	0·12
4	5·95	5·75	0·2	5½	4½	1½	3·54	3·23	0·31
5	5·7	5·7	0	7½	6½	1½	3·72	3·54	0·18
6	6·02	5·92	0·1	6½	6½	0	3·54	3·42	0·12
7	5·72	5·72	0	6½	6½	0	3·54	3·23	0·31
8	5·8	5·75	0·05	7½	6½	1½	3·72	3·54	0·18
9	5·65	5·50	0·15	7½	6	1½	3·42	3·32	0·1
10	5·7	5·7	0	7	5½	1½	3·54	3·42	0·12
11	5·7	5·7	0	5½	3½	2½	3·42	3·42	0
12	5·7	5·7	0	6	6	0	3·42	3·42	0
13	5·7	5·7	0	5½	5½	0	3·32	3·32	0
14a	5·55	5·55	0	8½	8½	0	3·54	3·54	0
14b	5·55	5·35	0·2	8½	7	1½	3·54	3·54	0

TABLE III—EFFECT OF 5 MG. BENZEDRINE ON DARK-ADAPTATION

1	5·6	5·45	0·15	7½	6	1½	3·42	3·10	0·32
2	5·85	5·75	0·1	8½	6	2½	3·42	3·23	0·19
3	5·7	5·65	0·05	7½	5	2½	3·54	3·32	0·22
4	5·9	5·8	0·1	5½	4½	1	3·54	3·32	0·22
5	5·7	5·7	0	8	5½	2½	3·63	3·42	0·21
6	6·0	5·8	0·2	6½	5½	½	3·54	3·32	0·22
7	5·7	5·7	0	6	3½	2½	3·42	3·42	0
8	5·8	5·7	0·1	7½	6½	1½	3·72	3·54	0·18
9	5·7	5·7	0	5½	5½	0	3·32	3·32	0

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within the normal range, dark-adaptation and blood vitamin A may vary in opposite directions also shows that other factors must affect dark-adaptation. Moreover, congenital and hereditary night-blindness and certain diseases of the retina affect the dark-adaptation independently of vitamin A. The only proof that any subject has poor dark-adaptation because of deficiency in vitamin A is the improvement of the dark-adaptation curve with vitamin-A therapy. It is essential to use a stringent test such as that described if very deficient subjects are not to be missed, because of the transient effect of small doses on such subjects. In practice, by far the commonest cause of a high threshold is deficiency of vitamin A and surveys of threshold values in a population show, almost entirely, differences in the state of nutrition in respect of this vitamin.

Even when it is known, however, that vitamin A can cure a case it is not known what part of the cycle of vitamin-A metabolism is at fault. Any of the stages between the diet and the conversion to the retinal pigment may be affected and any of these conditions might be cured by large doses of vitamin A. Investigations into the different parts of this cycle are very sparse (see Patek and Haig 1939, Chevallier and Choron 1938, Thiele and Klodwig 1939, Lindquist 1938, May et al. 1940).

The relation between the blood vitamin A and the degree of night-blindness is also complicated. It is clear that since vitamin A can improve hemeralopia there must be some relationship between the vitamin A available to the retina and the curve of dark-adaptation. From the results described here it is certain that there is no standard level of blood vitamin A which could be used as a test for deficiency instead of the "threshold lability" test. On the other hand, in any individual there does appear to be a critical level of blood vitamin A below which the final rod threshold is abnormal. Below this level, the lower the blood vitamin A the higher the rod threshold. Raising the blood vitamin A above this level, however, does not improve the final rod threshold.

It is not known whether the level of blood vitamin A bears any relationship to the reserves of the body, as found in the liver, or why there should be different normal levels of blood vitamin A in different people.

The mechanism of the action of alcohol and benzedrine in dark-adaptation is obscure, nor is it necessarily the same in both. The effects are not related to the amount of subjective effect produced and in the case of benzedrine the general effects are maximal after the effect on dark-adaptation has worn off. They are also not associated with changes in the blood vitamin A; in fact, they may produce an improvement beyond that possible with vitamin A, and threshold values may be found considerably lower than those met with in even the best normal individuals. The use of these drugs, and especially of alcohol, for improving dark-adaptation must be considered in the light of their other, more obvious, effects.

SUMMARY

In a subject with night-blindness due to vitamin-A deficiency a single dose of the vitamin may produce no improvement, an improvement lasting a few hours, or one lasting several days or weeks.

A severely deficient subject given repeated doses of vitamin A will show no response or a transient response at first and a more prolonged effect after further dosing.

The dose of vitamin A required to produce prolonged improvement is usually between 300,000 and 2,000,000 I.U. This dose is not related to the initial degree of night-blindness.

In testing whether a case of night-blindness is due to deficiency of vitamin A possible transient responses must be borne in mind. It is necessary to ensure (*a*) that the dose is adequate and (*b*) that the test is performed at a time when improvement is likely.

There is no standard level of blood vitamin A which would indicate whether a subject is deficient in vitamin A or not.

In any single individual there is a critical level of blood vitamin A. Below this level, the lower the blood vitamin A the higher the final rod threshold.

Alcohol and benzedrine both produce transient improvement in dark-adaptation without any corresponding rise in blood vitamin A. The resulting improvement may be beyond that possible with vitamin A.

Vitamin C has not been found to improve any subject tested even if originally deficient in this vitamin.

I should like to thank Prof. C. R. Harington for his encouragement and for the laboratory and other facilities, and Dr. A. G. Spencer for his coöperation in some of the preliminary investigations.

I am indebted to British Drug Houses Limited for generous supplies of vitamin-A alcohol and esters.

REFERENCES

Baum, W. S. and McCoord, A. B. (1940) *J. Pediat.* **16**, 409.
Booher, L. E., Callison, C. C. and Hewston, E. M. (1939) *J. Nutrit.* **17**, 317.
Chevallier, A. and Choron, Y. (1938) *C.R. Soc. Biol. Paris*, **127**, 1443.
Clausen, S. W., Baum, McCoord, Rydeen, J. O. and Breese, B. R. (1940) *Science*, **91**, 318.
Dow, S. and Steven, D. (1941) *J. Physiol.* in the press.
Edmund, C. and Clemmesen, S. (1936) *Acta med. scand.* **89**, 69.
Gray, E. L., Morgareidge, K. and Cawley, J. D. (1940) *J. Nutrit.* **20**, 67.
Hecht, S. (1940) Article Chemistry of Vision, Modern Trends in Ophthalmology, London.
— Mandelbaum, J. (1939) *J. Amer. med. Ass.* **112**, 1910.
— — (1940) *Amer. J. Physiol.* **130**, 651.
Kimble, M. S. and Gordon, E. S. (1939) *J. biol. Chem.* **128**, 52 P.
Lewis, J. M. and Haig, C. (1940) *J. Pediat.* **16**, 285.
Lindquist, T. (1938) *Acta med. scand.* Suppl. 97.
McFarland, R. A. and Forbes, W. H. (1940) *J. gen. Physiol.* **24**, 69.
Malméjac, J., Chevallier and Choron (1935) *C.R. Soc. Biol. Paris*, **119**, 1158.
May, C. D., Blackfan, K. D., McCreary, T. F. and Allen, F. H. jun. (1940) *Amer. J. Dis. Child.* **59**, 1167.
Patek, A. J. jun. and Haig (1939) *J. clin. Invest.* **18**, 609.
Pett, L. B. (1940) *Science*, **92**, 63.
— Le Page, G. A. (1940) *J. biol. Chem.* **112**, 585.
Steininger, G., Roberts, L. J. and Brenner, S. (1939) *J. Amer. med. Ass.* **113**, 2381.
Steven and Wald, G. (1941) *J. Nutrit.* **21**, 461.
Stewart, C. P. (1941) *Edinb. med. J.* **48**, 217.
Thiele, W. and Guzinski, P. (1940) *Klin. Wschr.* **19**, 345.
— Klodwig, U. (1939) *Ibid*, **18**, 821.
Wald (1935) *J. gen. Physiol.* **19**, 351.
— Jeghers, H. and Arminio, J. (1938) *Amer. J. Physiol.* **123**, 732.
— and Steven (1939) *Proc. nat. Acad. Sci., Wash.* **25**, 344.
Yudkin, S. (1941*a*) *Brit. J. Ophthal.* **24**, 231.
— (1941*b*) *Biochem. J.* **35**, 551.

SIGNIFICANCE OF INTELLIGENCE IN SKIN CASES

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IN a previous paper (Hodgson 1941) I showed that subnormal intelligence was very common among Army patients suffering from scabies. During recent months the intelligence of 1002 patients attending a military dermatological clinic was tested by the R.E.C.I. matrices (Penrose and Raven 1936, Raven 1939), and allotted by a method previously described to one of the following grades: (*a*) very inferior intelligence; (*b*) below average intelligence; (*c*) average intelligence; (*d*) above average intelligence.

Every patient who attended the clinic during the period suffering from a disease shown in the first column of table I was tested in this way. This table also shows for each disease the number of patients examined and the results of the intelligence test.

For the purposes of comparison these diseases can be classified into three groups: skin diseases; infestations;

TABLE I—GROSS FIGURES FOR ALL DISEASES

—	Cases	Grade (*a*) Very inf.	(*b*) Below av.	(*c*) Av.	(*d*) Above av.
Skin diseases—					
Alopecia areata	27	3	8	13	3
Eczema	37	0	7	19	11
Impetigo	73	2	24	39	8
Pityriasis rosea	12	2	2	7	1
Psoriasis	48	4	9	25	10
Seborrhœic dermatitis	66	3	19	38	6
Tinea (all cases)	33	2	12	15	4
Warts (excluding venereal)	10	0	3	6	1
Infestations—					
Scabies	407	72	155	153	27
Pediculosis pubis	90	18	32	36	4
Venereal diseases—					
Gonorrhœa	137	24	49	51	13
Syphilis	62	10	17	22	13

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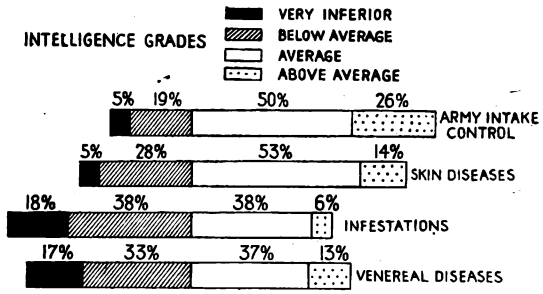
and venereal diseases. Statistical analysis, ætiology and clinical features all justify this grouping.

The percentage distributions of intelligence grades in the groups and in the control (500 consecutive recruits at a R.A.M.C. depot) are set out in table II and are compared diagrammatically in the figure.

TABLE II

—	Cases	Grade (per cent.)			
		(a)	(b)	(c)	(d)
Army intake control— ..	500	5	19	50	26
Skin diseases	306	5	28	53	14
Infestations	497	18	38	38	6
Venereal diseases ..	199	17	33	37	13

It will be seen that " very inferior " intelligence occurs more than three times as frequently in both the infestation and venereal groups as in the control group, while in the skin group it occurs with no greater frequency than in the control. Furthermore, all three groups of patients under consideration show a preponderance of subnormal intelligence, least decided in the skin group, and so great in the infestation group that actually as much as 56% fall into the subnormal intelligence grades. Mellanby's (1941) recent emphasis on the personal-contact factor in the spread of scabies lends particular interest to the close



Distribution of intelligence grades.

similarity in the intelligence distributions of the infestation and venereal groups, especially in view of their widely different pathogeneses.

An investigation of the intelligence distribution of the individual diseases which form the groups in this paper is in progress.

SUMMARY

The intelligence of patients attending a military dermatological clinic has been investigated. For the purpose of comparison cases were divided into 3 groups: venereal diseases, infestations and other skin diseases.

A high proportion of men with " very inferior " intelligence was found in the infestation and venereal-disease groups. All three groups showed a higher proportion of subnormal intelligence than the control and among infested patients the proportion of subnormal intelligence amounted to 56%.

I wish to thank Lieut.-Colonel P. J. Dwyer for giving facilities for this investigation and Prof. M. Greenwood for his statistical advice.

REFERENCES

Hodgson, G. A. (1941) *Brit. med. J.* **1**, 316.
Mellanby, K. (1941) *Ibid*, **2**, 405.
Penrose, L. S. and Raven, J. C. (1936) *Brit. J. med. Psychol.* **16**, 97.
Raven (1939) *Ibid*, **18**, 16.

OSLER MEMORIAL IN PHILADELPHIA.—The " Old Post House " at Philadelphia General Hospital has been opened as a memorial to Osler because it was here that he taught and practised pathology when professor of clinical medicine in the University of Pennsylvania. The house, which had been relegated to the position of the hospital paint shop, has been restored through the generosity of Messrs. John Wyeth and Brother, so that it resembles as nearly as possible what it was in Osler's time, and in it hangs the painting by Dean Cornwell, also the gift of Messrs. Wyeth, which shows Osler in characteristic attitude addressing a group of residents.

MACROCYTIC ANÆMIA IN PREGNANT WOMEN ON THE GOLD COAST*

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THIS paper is based on a study of 100 cases of macrocytic anæmia selected from the records of the Maternity Hospital, Accra, in the ten years (1928–38) after the hospital was opened; 38 of the cases were under my care. The cases constituted about 1% of the total in-patients, but since only severe and definite cases are included this figure does not represent the full incidence of the disease. I have included cases complicated by malaria and hookworm and some cases with concurrent urinary infection. In all these the anæmia was so profound that I had no hesitation in considering them to be primarily cases of macrocytic anæmia of pregnancy.

CLINICAL HISTORY

Detection of anæmia among the dark-skinned by inspection alone is difficult, and slight cases tend to escape notice. The prevalence of anæmia in 481 unselected cases attending the maternity hospitals in Accra and Kumasi is shown in the table. Macrocytic anæmia, in my 38 cases, appeared to develop rapidly; the duration of symptoms was seldom more than a fortnight. In one or two cases admitted to hospital on account of other conditions, severe macrocytic anæmia was observed to develop within a few days.

A primipara of 32 weeks maturity, complained of general pains and headache; the hæmoglobin on admission was 55%; six days later it had dropped to 38%, and the red-cell count was 1,360,000 per c.mm.

Age-incidence cannot be given, because the patients do not know their ages; 64 were primiparæ and 36 multiparæ; thus in the Gold Coast multiparity is not an important factor in ætiology. The stage at which the anæmia developed, in the 106 pregnancies of these 100 women, was as follows:

Maturity in weeks	Cases	Maturity in weeks	Cases
Under 20	3	31–35	26
20–25	18	36–40	13
26–30	40	Unknown	6

Thus 29 cases occurred in women of less than twenty-eight weeks' maturity, showing that the disease was not uncommon prior to the last trimester period.

Concurrent infections.—The history of yaws was positive in 18 and negative in 79 cases; 3 were unrecorded; but since the history depended entirely on the statements of the patients these figures are not necessarily—or even probably—correct. The Wassermann reaction was investigated in 53 and was found to be strongly positive in 11, and positive or faintly positive in 7. This does not differ significantly from the positive-Wassermann rate of the population as a whole, which is about 32% (Medical Research Institute, Accra).

Malarial parasites were present in 29 cases. The incidence of hookworm and urinary infections is noted later.

These observations may be compared with the figures obtained in the routine laboratory examination of in-patients in the Accra maternity hospital shown below:

Malaria

Blood examinations: 6925.
Malarial parasites present in 27%.

Wassermann Reaction

Examinations: 5335. Positive Wassermann rate 32·5%.

Fæces

Examinations: 1372. Ascaris ova present in 17%.
Ankylostome ova present in 16%.
Tænia ova present in 1 case.

SIGNS AND SYMPTOMS

When the patient is first seen, anæmia is usually well advanced and she is complaining of one or more of the

* Abstract of a thesis presented for degree of M.D. University of Edinburgh, October, 1939.

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symptoms of anæmia: breathlessness, palpitation, weakness or giddiness. Other common complaints are of swelling of the feet and cough. Sometimes there is no complaint of ill health, and at other times the complaint may be of fever, dysentery or the passage of scanty urine. The patients are usually well nourished. The severe anæmia is characteristically associated with a slight blurring of the features, due to œdema of the face. Frank œdema of the feet is common, and this may extend up the abdominal wall. There may be a faintly icteric tinge of the conjunctiva, but this is usually associated with concurrent malaria. The tongue may be sore, or moist and white and indented by the teeth. Sore mouth is not more common in these cases of macrocytic anæmia than it is in the pregnant population as a whole. The temperature is usually raised; pyrexia was present in 82 of the cases considered here.

There is considerable breathlessness on exertion, a rapid pulse and soft blowing systolic murmurs over the præcordia. Œdema was noted in 38 of the 100 cases. The respiration-rate is raised in severe cases, and a constant, loose, exhausting cough may be present, accompanied by moist râles in the chest; cough was present in 24 cases of the series. Enteritis may be severe and misleading, but clears up as the general condition improves. The liver and spleen may be enlarged; splenic enlargement was recorded in 11 cases. No sign of involvement of the nervous system was observed.

Fæces and urine.—The fæces were examined in 85 cases. Ascaris ova were found in 17, hookworm ova in 16, *Entamœba histolytica* in 2, trichuris ova in 2 and strongyloides larvæ in 2; *E. coli* was present in 7 cases and flagellates in 15. Flagellates are as a rule seen in patients who are debilitated, but there seems little reason to consider them as the cause of the enteritis which is so often present in macrocytic anæmia. Albumin, pus organisms and even casts may be present in the urine. Infection may have some rôle in causation, but the urine clears as the general health improves. Albuminuria was present in 54 cases in the series, and micro-organisms were found in 9 of the 25 cases in which the urine was examined bacteriologically. Schistosome ova were present in 2 cases.

Blood picture.—There is a considerable reduction in the number of red cells. When the case is first seen the count is commonly about a million per c.mm. In several cases the count was below this figure; first blood-counts done in 106 pregnancies in the 100 women in the series gave the following results:

Red cells (millions)	Cases	Red cells (millions)	Cases
0·4–0·7	2	1·5–2	28
0·7–0·9	12	2–2·35	12
0·9–1·2	27	No record	3
1·2–1·5	22		

In many of these the patient recovered. The colour index was over 1 in 78 cases and between 1 and 0·8 in 28. Blood films were examined on 294 occasions: red cells with a diameter of over 7·5 μ were observed in 78 (26%); polychromasia in 10 (1%); cells deficient in hæmoglobin in 79 (27%); poikilocytosis in 1 (0·3%); anisocytosis was usual and in most cases macrocytes were present; normoblasts and megaloblasts can usually be found and may be numerous. In one case there were 9000 white cells per c.mm., with Hb 22%, 900,000 red cells per c.mm. and 7 normoblasts and 7 megaloblasts per 100 white cells. The film in macrocytic anæmia differs from that of true pernicious anæmia in the rareness of poikilocytosis. Sickling of the red cells was found in 2 of 9 cases examined for this condition. Since the rate for pregnant women as a whole is 13% (Medical Research Institute, Accra), this result appears to correspond with the average. The leucocytes are seldom increased, and the differential count showed no significant variation from the normal. The inversion in the proportion of polymorphs and lymphocytes mentioned in the literature was observed only in one fatal case. Primitive white cells were occasionally observed.

The van den Bergh reaction was carried out in only 3 cases. The direct reaction was negative in all 3 and the indirect positive, which conforms with the general findings in this disease.

COURSE

Without treatment the condition progresses rapidly—in a few days the patient may become comatose and die. On the other hand, many cases tend to be cut short by the onset of premature labour. The woman may die during labour or in the first day or two of the puerperium, but if she survives this period recovery often sets in and may be as rapid as the progress of the illness in the first place. In most cases labour is premature, rapid and singularly bloodless. The uterine muscle does not seem to be weakened, and provided the cardiac muscle does not fail birth is swift. The infant-mortality and stillbirth rates are high. The puerperium tends to be febrile and sepsis added to the anæmia seriously affects the chances of survival.

The history of cases treated in hospital contrasts with that of untreated cases. The patient was considered to be in a critical condition if the hæmoglobin was below 20%, but even then response to treatment was usually rapid and gratifying. Twenty-four hours after admission the patient may look, if anything, more bloodless than when first seen; after forty-eight hours of liver treatment, however, one can say definitely that improvement has begun, even without blood-examination. Faint flushing of the conjunctivæ is a sign which makes the clinician feel satisfied about the patient for the time being. Every day thereafter improvement is apparent; blood-examination a week after admission shows a gain of at least half a million in red cells, and of 5–10% in hæmoglobin. The next week should show the same advance, especially if iron has been added to the liver treatment. At the end of a week the œdema and cough should have almost disappeared. The temperature settles down in ten days or so, and intercurrent gastro-intestinal and urinary complications usually recover as the anæmia improves. At the end of the first week the patient feels much better, and in two weeks she becomes restive. Probably she may be prevailed on to stay another week in hospital; a few very severe cases have remained even longer. By the end of three weeks improvement is so pronounced that the patient is allowed to go, usually with instructions to continue to take liver. This advice is rarely followed, but in those cases where a follow-up was possible it was found that the anæmia did not return in that pregnancy. Once response to treatment is definitely established labour rarely gives rise to anxiety.

Of this series, 53 patients were delivered in hospital; the puerperal morbidity-rate among them was 34%, the prematurity-rate 64%, and the stillbirths and deaths of infants within the first week of life, together, 40%.

A follow-up of the cases after discharge from hospital has been carried out as far as possible, but the difficulties are peculiar: the people are illiterate and may be unable to give their correct names or addresses. As far as can be judged these women recover their normal health some time after discharge from hospital, and relapse has not been observed during the same pregnancy. Recurrence of anæmia is common, however, in subsequent pregnancies; 10 of the 100 patients were traced through subsequent pregnancies, and in 8 of them severe macrocytic anæmia developed in the next pregnancy; in 1 case, though the second pregnancy was apparently normal, severe anæmia developed in the third.

PROGNOSIS AND MORTALITY-RATE

If the patient is untreated, the outlook is bad unless labour is early. The prognosis is good under treatment, provided the patient is not in extremis when first seen and if she is not already in labour. If the hæmoglobin is not less than 20% and the red cells not below 1,000,000 recovery is the rule. One or two patients under my care had a much lower hæmoglobin value and recovered, but such cases cause anxiety for some time, and must be considered as critical, especially if they go into labour. The prognosis has greatly improved since liver extract suitable for parenteral administration has been available, but, as might be expected, the patients are so ill that their ability to take, retain and absorb liver by mouth is uncertain and variable.

Acute anæmia appearing for the first time in the puerperium may cause anxiety. Œdema is not severe and the question of sepsis has to be considered. Even a low-grade infection makes the response to treatment less

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satisfactory, and some of these cases tend to become aplastic in type.

There were only 5 deaths among the 100 cases treated in hospital. This figure is low considering that the anæmia was often severe.

TREATMENT

Treatment was by rest in bed, full diet and raw liver or liver extract by mouth or by injection. If the patient could take it, ½ lb. of raw liver was given daily, finely minced, with salt and pepper, and eaten with orange juice. The patients preferred it to Marmite, and there was some evidence that liver was more quickly beneficial. In India marmite is the sheet anchor of therapy. It was used also in this series, but only in small doses, which probably had little effect. Campolon injections were used in all severe case from the middle of 1935. The dose at first was 2 c.cm. injected into the buttock every second day for 5–7 injections. Later it was found that this was often inadequate, and that 4 c.cm. daily was needed to get a satisfactory result. As the macrocytic anæmia responds to treatment, the underlying and concurrent hypochromic anæmia is unmasked, and a useful response to iron takes place. Iron therapy was usually started as soon as the initial response to liver therapy was well established—that is, in five to seven days. Iron was given as one of the scale preparations in doses of gr. 30 thrice daily, or in conjunction with arsenic.

Blood-transfusion has seldom been necessary. According to Balfour (1927), when response is unsatisfactory a small transfusion, intravenously or intramuscularly, will give the necessary stimulus towards recovery. In the case of a strongly positive Wassermann reaction, it is as well to give a course of neoarsphenamine.

Induction of labour is seldom required. In a few cases, which respond well at first and then remain stationary with hæmoglobin and red cells still at very low figures, it may be desirable to induce labour in the interest of the mother, but the measure is not devoid of risk because of the danger of sepsis developing in the puerperium.

In cases discharged from hospital before delivery it has been impossible to insist on continuance of treatment or even to keep track of the patients. Those who could be followed up seem to have gone through labour safely even without further treatment. The danger of the recurrence of anæmia in future pregnancies can probably be reduced by antenatal supervision and by early treatment of cases showing a low hæmoglobin level.

ÆTIOLOGY

According to recent literature macrocytic anæmia is regarded as a deficiency disease due to lack of the hæmopoietic factor necessary to normal blood-formation. This lack may be due to several factors of which the three most important are:

1. Temporary lack of intrinsic factor in the gastric secretion or to temporary failure of power of assimilation (Strauss and Castle 1932, 1933, Vaughan 1938).
2. Lack of extrinsic factor or of vitamin B_2 in the diet.
3. A predisposing iron-deficiency anæmia, believed by some writers to be always present before macrocytic anæmia can develop, and due mainly to unsatisfactory diet (Larrabee 1925, Strauss and Castle 1935).

I believe that all of these factors may have some bearing on the prevalence of this form of anæmia in the Gold Coast. The sick in the tropics are often afflicted with two, three or four different pathological conditions, and since in any form of ill health the gastric secretion is seriously concerned, it is not unreasonable to presume lack of power of assimilation and perhaps temporary lack of intrinsic factor. The diet of the people on the Gold Coast is demonstrably poor in vitamin B_2 or extrinsic factor, so that even in health there may be little margin. Wills (1939) holds that all cases of anæmia in pregnant women associated with less than 90% of hæmoglobin should be treated. If this is taken as the standard, the amount and degree of anæmia on the Gold Coast as shown in the table is grave indeed.

Another factor may be the presence of liver disease and its influence on the ability of the body to store or to utilise hæmopoietic substance. Goldhamer, Isaacs and Sturges (1934) demonstrated that the normal liver stores hæmopoietic substance, but that if diseased it fails to do so or is unable to release it. Clark (1936) reported that disease of the liver appears to be more frequent in Nigeria, where dietetic conditions are similar to those on the Gold Coast, than it is at home. He held, as a result of rat experiment, that this is largely due to the poor class of carbohydrates, especially cassava and cocoa-yam, which are largely consumed. He considered these roots to be dangerous cyanogenic substances in the absence of a sufficient supply of good-class protein; in some circumstances maize may act in the same way. Fairley and his colleagues (1938) found that malaria caused liver damage in Macedonia, and malaria is prevalent on the Gold Coast.

BLOOD FINDINGS IN TWO GROUPS OF 481 UNSELECTED PREGNANT WOMEN WITH NO DEFINITE SYMPTOMS OF ANÆMIA.

Group I: 100 women attending hospital at Kumasi.
Group II: 381 women attending hospital at Accra.

Red cells (millions)	Cases (group I*)	Hb (Sahli) %	Cases (group I)	Cases (group II†)
Over 5	3	Over 80	5	14 (4%)
		70–80	33	77 (20%)
4–5	37	60–70	53	172 (45%)
3–4	53	50–60	8	108 (28%)
2–3	7	Under 50	1	10 (3%)

* Colour-index unity or over in 23; malarial parasites present in 23. † Malarial parasites present in 94.

Factors predisposing to macrocytic anæmia thus appear to be various, but the most important are, I believe, the three first mentioned.

To what extent tropical macrocytic anæmia of pregnancy and macrocytic nutritional anæmia in the non-pregnant are the same disease has not been finally agreed. Balfour (1927) reported cases which appeared to be identical except that pregnancy did not coexist. Fairley and his colleagues (1938) suggested that "nutritional" rather than "tropical" macrocytic anæmia was a more suitable term when reporting cases occurring in Macedonia. Davidson and Fullerton (1939) refer to nutritional macrocytic anæmia and to macrocytic anæmia of pregnancy under different headings.

My own experience of macrocytic anæmia among non-pregnant women in the Gold Coast is too limited to be of value, but in the cases occurring in pregnancy the problem appears to be essentially one of nutritional defect. From observation of the disease and of the prompt relief which follows the administration of liver or liver extract, I consider that macrocytic anæmia is not a disease of pregnancy but a disease associated with pregnancy. Pregnancy is the most common and prolonged strain to which young women are subjected; add to this an unsatisfactory diet with the disorder of gastric secretion which is common in pregnancy and the stage is set for breakdown in the blood-forming system. In the absence of pregnancy the breakdown would probably not occur, or at least not occur until a more advanced age.

SUMMARY

Severe macrocytic anæmia is not uncommon among pregnant women on the Gold Coast; 100 severe cases are analysed.

In both treated and untreated cases there is a tendency to premature labour with stillbirth or death of the infant in the first week of life. When untreated the maternal mortality is high, but if the anæmia is not too far advanced recovery may be rapid after delivery. If anæmia is severe, death rapidly supervenes.

Macrocytic anæmia of pregnancy quickly responds to treatment with liver or liver extract, preferably administered by injection. The fatality in the present series was only 5%. Severe anæmia often recurs in subsequent pregnancies.

The more important predisposing factors are unsatisfactory diet, intercurrent disease, especially malaria, and hypochromic anæmia.

Many Gold Coast women are anæmic during pregnancy. Prevention of this depends largely on improvement in the general standard of living. In the meantime the obstetrician must be on the alert to detect and treat all

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SERUM CALCIUM AND INORGANIC PHOSPHORUS IN PARATHYROID TETANY

THEIR BEARING ON TREATMENT

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AMONG the measures recommended in the treatment of parathyroid tetany by raising the serum calcium are the administration of parathyroid hormone, thyroid, calcium salts, vitamin D, dihydrotachysterol (A.T. 10), lactose, the production of an acidosis, and diets with a high calcium to phosphorus ratio.

Parathyroid hormone.—It is now clear that the chief function of the parathyroids is the mobilisation of calcium from the bones into the blood-stream. Removal of the parathyroids causes calcium to leave the blood, probably to be precipitated in the bones, for as was first shown by Greenwald and Gross (1925) the sudden fall in the serum calcium in tetany is accompanied by a lowering in the calcium excretion. The abstraction of the active principle of the parathyroid glands by Hanson (1923) and Collip (1925) led at once to its employment in the treatment of hypoparathyroidism. Albright and others (1929) showed that injection of parathyroid hormone in tetany brought about an abrupt increase in the urinary excretion of phosphorus followed by a fall in the blood phosphorus (unless the serum calcium rose above 15 mg. per 100 c.cm. when the urinary excretion of phosphorus fell and blood phosphorus rose); and a gradual increase in the urinary excretion of calcium with a gradual but large rise in serum calcium. Several workers have been warned against the employment of parathyroid hormone as a routine measure in the treatment of tetany on the grounds of the danger of overdosage, of loss of effectiveness or of decalcification of the bones if used over long periods, as well as expense.

Thyroid.—Kunde, Oslund, Kern (1928, 1931) found that the tetany of thyroparathyroidectomised dogs could be temporarily controlled by thyroid feeding. After this, Aub and others (1932) stated that the administration of thyroid or thyroxin to cases of hypoparathyroidism resulted in a well-marked elevation of the serum calcium, and their findings have been accepted by Hunter (1930), Shelling (1935) and Means (1937).

Calcium salts.—The administration of calcium salts intravenously, intramuscularly or by mouth still remains the chief therapeutic measure in parathyroid tetany. When a prompt response is desired calcium is given intravenously as the chloride or gluconate in 10% solutions in doses of 10 c.cm. Salvesen, Hastings, and McIntosh (1924), Smith and Sternberger (1932), and Shelling (1935) have found that the maximum concentration of serum calcium (as much as 100% increase) is reached at the end of the injection; thereafter there is a rapid fall to the previous level in 2–4 hours. Calcium gluconate alone can be injected intramuscularly without causing severe inflammatory reactions. There is a choice of many salts to be given by mouth, but the chloride, lactate and carbonate are most commonly employed, the first because of its solubility and acidotic qualities which promote absorption, the second because of its palatability and the last because of its high calcium content.

Vitamin D and dihydrotachysterol (*A.T.* 10).—Since Holtz (1933) introduced dihydrotachysterol—or A.T. 10 (antitetanic preparation 10) as it is sometimes called—into the therapy of tetany a vast literature has accumulated on its value. According to McLean (1941) the effects of vitamin D and A.T. 10 are similar if given in comparable doses, and there is no reason "to attribute a higher degree of specificity or a lesser likelihood of toxicity to dihydrotachysterol than to vitamin D." One milligramme of calciferol is equivalent to 40,000 international units of vitamin D, and this is equal to 0·1 c.cm. of A.T. 10. Much confusion has arisen over the value of vitamin D in the treatment of parathyroid tetany. There are two well-defined dosage ranges; the first is antirachitic (700–1000 I.U. per day), and the second is the dosage necessary to raise a subnormal serum calcium (50,000–200,000 I.U. per day). According to McLean the higher dosage of vitamin D leads to an increase in the excretion of urinary phosphorus, a fall in serum phosphate, and a rise in the serum calcium, while both calcium and phosphorus are added to the blood by liberation of these minerals from the bones. Hess, Benjamin and Gross (1931), Jones and Rapoport (1931), and Shelling (1931) have shown that the calcæmic effect of vitamin D in large doses can be produced without calcium feeding. Vitamin D in large doses has therefore two distinct actions—it promotes absorption of calcium from the gut and it mobilises calcium and phosphorus from the bones.

Lactose.—Dragstedt and Peacock (1923) and Inouye (1924) stated that lactose-containing diets protected parathyroidectomised animals against tetany. Greenwald and Gross (1929) found this only to be true if large amounts of calcium are also contained in the diets. Thus lactose acts only by making the calcium more available.

Production of an acidosis.—Wilson, Stearns and Janney (1915), using hydrochloric acid, and Boyd, Austin and Ducey (1926), and Greenwald (1929), using ammonium chloride, studied the effect of acidosis on parathyroid tetany. The severity and frequency of the attacks were reduced and this was accompanied by an increased excretion of phosphorus. The effect on the serum calcium was variable. Anderson and Lyall (1939) found that hydrochloric acid raised the serum calcium of parathyroid tetany above normal.

Low phosphorus therapy.—The beneficial effects of a low phosphorus, high calcium diet have been substantiated by Shelling and Goodman (1934), Ellsworth (1933), and Anderson and Lyall (1939), who found that low calcium or high phosphorus diets were conducive to tetany, whereas high calcium or low phosphorus diets were ameliorative. It would appear that the desirable intake of phosphorus daily is not greater than 0·5 g., and with this amount of phosphorus 2 g. of calcium daily should be taken. In discussing the nature of a low phosphorus diet, Shelling has stated it means eating less meat, glands, nuts, milk, cheese and yolk of eggs, and more fruit, vegetables, white of eggs, carbohydrate and fat. Milk and cheese, which are the chief sources of calcium, also have a high phosphorus content.

PRESENT INQUIRY

In the present inquiry, a series of cases of postoperative parathyroid tetany (complicating subtotal thyroidectomy for relief of thyrotoxicosis) were investigated and the effect of thyroid, calcium salts, ammonium chloride and vitamin D (calciferol) on the blood chemistry determined. By this study it was hoped to rationalise the treatment of tetany when it occurs as a complication of subtotal thyroidectomy for the relief of thyrotoxicosis. In a previous paper (Robertson 1941c) attention has been drawn to transient mild postoperative attacks of tetany due to trauma or infection. In such cases there is a fall in serum calcium which invariably rises within a few days or weeks to normal without any calcium or other medication. The cases of parathyroid tetany in the present inquiry were all chronic ones, ranging from 3½ to 11 years in duration. Fluctuations due to changes in the activity of the parathyroids or accessory parathyroid tissue could therefore be reasonably excluded.

The chemical methods employed have already been described (Robertson 1941a), except for the measurement of the alkali reserve (Van Slyke 1917). In table I are given details of the seven cases investigated. Of these, two (cases 1 and 7) were unable to continue the investigations after thyroid feeding owing to evacuation problems. No form of therapy had been received by any patient for at least 1½ years. The calcium and phosphorus intakes were calculated from an average of 7–10 daily dietary surveys. The gastric analyses were normal, and all cases secreted free hydrochloric acid after gruel.

DR. RUSSELL: MACROCYTIC ANÆMIA (*continued*)

patients with low hæmoglobin values, in the expectation that by so doing severe anæmia may be successfully prevented.

I thank the Director of Medical Services of the Gold Coast for permission to publish this paper.

REFERENCES

Balfour, M. I. (1927) *Indian med. Gaz.* **62**, 491.
Clark, A. (1936) *J. trop. Med. Hyg.* **39**, 269.
Davidson, L. S. P. and Fullerton, H. W. (1939) in Dunlop, Davidson and McNee's Textbook of Medical Treatment, Edinburgh.
Fairley, N. H., Bromfield, R. J., Foy H. and Kondi, A. (1938) *Trans. R. Soc. trop. Med. Hyg.* **32**, 132.
Goldhamer, S. M., Isaacs, R. and Sturgis, C. C. (1934) *Amer. J. med. Sci.* **188**, 193.
Larrabee, R. C. (1925) *Ibid*, **170**, 371.
Strauss, M. and Castle, W. B. (1932) *Ibid*, **184**, 663.
— — (1933) *Ibid*, **185**, 539.
— — (1935) *Ibid*, **190**, 811.
Vaughan, J. M. (1938) *Brit. med. J.* **2**, 57.
Wills, L. (1939) *Med. Wom. Fed. quart. Rev.* July, p. 17.

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TABLE I—SUMMARY OF CASES OF PARATHYROID TETANY INVESTIGATED

Case.	Age	Since attack of tetany	Since any calcium medication	Daily intake		Maximum secretion of free HCl *	Milk daily
				Calcium	Phosphorus		
	Years			g.		(c.cm. n/10 NaOH	oz.
1	25	3½	1½	0·96	1·08	27	16
2	51	5½	5½	0·36	0·92	45	5
3	38	4	3	0·5	0·8	30	7
4	17	3½	2	1·2	1·3	24	24
5	31	11	6	1·16	1·36	18	30
6	30	3½	2	1	1·1	10	22
7	44	5½	2	0·84	1·02	16	12.

* By fractional test-meal using gruel (Beaumont, G. E. and Dodds, E. C. Recent Advances in Medicine, London, 1941.)

Thyroid feeding.—The results are given in table II. In every instance except one, thyroid administration was followed by a fall in serum calcium. The two mean values, 8·51 mg. per 100 c.cm. before and 8·01 mg. after thyroid, were found to have a highly significant difference ($t = 4·1$, $P = 0·001$), in spite of the small number of cases. The value of t was calculated from the individual pair differences.

Employing the same statistical methods no significant difference was found in serum inorganic phosphorus before and after thyroid feeding ($t = 0·6$ and $P = 0·5$).

In every instance thyroid administration was accompanied by a rise in the serum phosphatase, the mean value rising from 4·77 units to 6·16. This difference was found to be highly significant ($t = 4·1$, $P = ·001$). If the serum phosphatases of parathyroid tetany are compared with the normals previously published by Robertson (1941a) the two mean values of 4·77 units and 7·795 units are found to have a highly significant difference ($t = 3·16$, $P < 0·01$). The two mean values of 6·16 units for parathyroid tetany after thyroid feeding and 7·795 units for normals show no significant difference ($t = 1·26$, $P = 0·2$). These investigations indicate that thyroid administration lowers the serum calcium of parathyroid tetany, findings opposed to current belief. The serum phosphatase is diminished in parathyroid tetany and thyroid feeding raises it to normal.

Calcium salts.—In table III are the findings after the daily ingestion of the equivalent of 3 g. of calcium for two weeks. The analyses were carried out in the post-absorptive state, and the phosphate, lactate or chloride were employed. No significant difference could be detected in the level of the postabsorptive serum calcium before and after the daily administration for two weeks of these calcium salts in equivalent doses. For phosphate ($t = 0·92$, $P = 0·4$), for lactate ($t = 1·28$, $P = 0·3$) and for chloride ($t = 2·11$, $P > 0·05$), the values of t being calculated from the individual pair differences. No significant alteration in the serum phosphorus was found to take place after these various calcium administrations.

It is well established now (Bauer and Ropes 1926, Greenberg and Gunther 1932, Freeman, Kant and Ivy 1935) that in normal people the serum-calcium response to ingested calcium reaches its maximum at the end of two hours. Preliminary observations showed that cases of parathyroid tetany responded in a similar manner, the maximum concentration of serum calcium being reached at the second hour. In table IV are given the variations in the serum calcium and inorganic phosphorus before and two hours after the ingestion of various soluble and insoluble calcium salts. The absorption of an insoluble calcium salt will depend on its solution by the free hydrochloric acid of the stomach. All the cases investigated had a normal secretion of free hydrochloric acid. Examination of the results statistically, the value of t being calculated from the individual pair differences, show that there is no significant difference in the serum calcium before and after calcium phosphate ($t = 1·54$ and $P = 0·1$), but that the ingestion of calcium lactate and carbonate produced an elevation of the serum calcium which was highly significant (for lactate $t = 5·27$ and $P \ll 0·001$, and for carbonate $t = 4·93$ and $P \ll 0·001$). The serum inorganic phosphorus was not affected by the ingestion of any of the calcium salts. It seems, therefore, that the efficacy of a calcium salt in raising the serum calcium does not depend on its solubility (assuming a normal gastric secretion of free hydrochloric acid) but on its acid radicle.

TABLE II—EFFECT OF THYROID FEEDING ON SERUM CALCIUM, INORGANIC PHOSPHORUS AND PHOSPHATASE

Case	Before thyroid				After thyroid			
	Calcium	Inorganic phosphorus	Phosphatase *	B.M.R. †	Calcium	Inorganic phosphorus	Phosphatase *	B.M.R. †
	(mg. per 100 c.cm.)				(mg. per 100 c.cm.)			
1	8·2	3·6	5·4	− 16	7·2	3·8	7·7	+ 2
2	9	4·0	5·5	+ 6	9·0	4·3	6·4	+ 16
3	9·9	4·3	4	− 22	9·5	4·1	5·1	+ 11
4	8·2	5·7	5·2	− 5	7·9	5·4	8	+ 21
5	6·2	5·5	5·2	− 10	5·6	5·7	6·3	+ 9
6	9·1	4·2	4·3	+ 2	8·4	3·9	4·4	+ 23
7	9	4·5	3·8	− 31	8·5	4·1	5·2	− 7
Mean	8·51	4·54	4·77	− 11	8·01	4·47	6·16	+ 10

* Units of King and Armstrong. † Standard of Aub and Dubois.

Ammonium chloride.—The results are given in table V. Three grammes of ammonium chloride were given daily, and if it is assumed that complete conversion into urea and hydrochloric acid occurred this would be equivalent to 2·05 g. of hydrochloric acid or 560 c.cm. of a N/10 solution. There were no significant alterations in the serum calcium ($t = 1·005$; $P > 0·3$) and serum inorganic phosphorus ($t = 0·73$; $P = 0·5$) as a result of ammonium-chloride feeding in doses of 3 g. daily, despite significant changes in the alkali reserve ($t = 2·44$; $P < 0·05$).

TABLE III—SERUM CALCIUM AND INORGANIC PHOSPHORUS IN THE POSTABSORPTIVE STATE, AFTER INGESTION OF VARIOUS CALCIUM SALTS IN DOSES EQUIVALENT TO 3 G. OF CALCIUM (7·5 G. PHOSPHATE, 8·25 G. CHLORIDE OR 22·5 G. LACTATE) DAILY FOR TWO WEEKS

Case	Wt (kg.)	Daily dosage Calcium (mg./kg.)	Serum calcium						Serum phosphorus					
			Phosphate		Lactate		Chloride		Phosphate		Lactate		Chloride	
			B	A	B	A	B	A	B	A	B	A	B	A
			(mg. per 100 c.cm.)											
2	46	65·2	9	8·7	9·6	9	8·8	9·7	3·9	4	4·5	4·3	3·7	4·2
3	48	62·5	9·5	9·3	9·3	8·7	9	9	4·4	3·7	4	4·4	4	4·3
4	54	55·6	8·2	7·9	8·3	7·1	7·9	8·3	5·7	6·4	6	5·9	6	5·6
5	48	62·5	6·2	6·8	7·8	8·3	7	8	5·5	4·9	5	5·2	4·5	4·6
6	47	63·8	9·6	8·9	9	9	9	9	4·2	3·8	4	3·6	4	4
Mean ..			8·50	8·32	8·8	8·42	8·34	8·8	4·74	4·56	4·7	4·68	4·44	4·54

TABLE IV—SERUM CALCIUM AND INORGANIC PHOSPHORUS 2 HOURS AFTER INGESTION OF SOLUBLE AND INSOLUBLE CALCIUM SALTS IN DOSES EQUIVALENT TO 2 G. OF CALCIUM (5 G. PHOSPHATE, 15 G. LACTATE OR 5 G. CARBONATES).

Case	Dosage of calcium (mg./kg.)	Calcium phosphate				Calcium lactate				Calcium carbonate			
		Serum calcium		Serum phosphorus		Serum calcium		Serum phosphorus		Serum calcium		Serum phosphorus	
		B	A	B	A	B	A	B	A	B	A	B	A
		(mg. per 100 c.cm.)											
2	43·5	9	9·2	4·3	4·3	9·6	10·7	4·5	4·8	9·3	9·8	4·2	4·1
3	41·7	8·7	8·9	4·4	4·3	9·3	10·2	4	4·3	9·1	9·4	4·2	4·2
4	37	8	8·7	5·9	6·7	8·3	10·1	6	6	8·9	9·8	5·2	5·5
5	42	8·3	8	5·2	5·2	7·8	8·8	5	5·1	8·4	9·1	4·8	4·4
6	43	9	9·6	4	4·3	8·9	9·5	3·9	3·9	9·6	10	4	3·6
Mean ..		8·6	8·88	4·76	4·96	8·78	9·86	4·68	4·82	9·06	9·62	4·48	4·36

B = before. A = after.

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Vitamin D (calciferol).—The results are given in table v. In every instance calciferol administration was followed by a rise in the serum calcium. The elevation of the serum calcium was highly significant ($t = 12{\cdot}7$ and $P \lll 0{\cdot}001$) and was present in the postabsorptive phase. This rise in the serum calcium occurred in the absence of any orally ingested calcium other than that provided in the diet. No significant changes occurred in the serum inorganic phosphorus ($t = 0{\cdot}8$; $P = 0{\cdot}4$).

REGENERATION OF PARATHYROID TISSUE

In a previous paper, Robertson (1941b) attention was drawn to mild forms of parathyroid disturbance, where in the absence of the clinical manifestations of tetany the serum calcium fell. Without any form of calcium therapy, within a few weeks the serum calcium rose. Likely causes of this fall in the serum calcium were said to be trauma to the parathyroid glands through manipulation during the operation and disturbance of their blood-supply through œdema, blood-clot or infection. When destruction of the parathyroid glands is present and tetany appears, steps must be taken to increase the serum calcium. Many workers have raised the question of the presence of accessory and regenerative parathyroid tissue in the body which might function during tetany. When therapy designed to raise the serum calcium is being given, it is not easy to determine with certainty the part, if any, played by regenerative or accessory parathyroid tissue. In table III of this paper it was shown that, in the postabsorptive state, calcium given by mouth did not elevate the serum calcium. It follows therefore that, if any elevation of serum calcium occurs in the postabsorptive state, either regeneration of or accessory parathyroid tissue is present.

In table VI, observations on twelve cases of parathyroid tetany are set out. Two cases had no treatment, nine were given calcium lactate by mouth, and one was given a single injection of calcium intravenously. In the postabsorptive state none of these forms of calcium therapy could explain an elevated serum calcium. In

TABLE V—POSTABSORPTIVE STUDY—SERUM CALCIUM, INORGANIC PHOSPHORUS AND ALKALI RESERVE AFTER INGESTION OF 3 G. OF AMMONIUM CHLORIDE DAILY FOR TWO WEEKS. LEVELS OF CALCIUM AND INORGANIC PHOSPHORUS AFTER THE DAILY INGESTION OF 2·5 MG. OF CALCIFEROL (100,000 I.U. VITAMIN D) FOR TWO WEEKS WITHOUT CALCIUM ADDITIONAL TO DIET.

Case	After ammonium chloride						After calciferol			
	Serum calcium		Serum phosphorus		Alkali reserve		Serum calcium		Serum phosphorus	
	B	A	B	A	B	A	B	A	B	A
	mg. per 100 c.cm.				c.cm. CO_2%		mg. per 100 c.cm.			
2	8·3	8·3	3·3	3·9	67	63	8·3	9·7	3·9	4·3
3	9·3	9·3	4·1	4·4	68	64	9·3	10·1	4·4	4·2
4	7·1	7·8	5·9	5·6	61	61	7·8	8·9	5·6	5·2
5	8·8	6·3	4·6	5·6	68	62	6·3	8·4	5·6	4·8
6	9	9·2	3·6	3·8	56	56	9·2	9·6	3·8	4
Mean	8·55	8·18	4·5	4·66	64	61	8·18	9·34	4·66	4·5

every instance there was a rise in the serum calcium above the level during tetany. The mean values of 6·8 mg. per 100 c.cm. and 8·9 mg. were found to have a highly significant difference ($t = 5{\cdot}95$; $P \ll 0{\cdot}001$). It seems that following tetany there is regeneration of or accessory parathyroid tissue. It must be pointed out, however, that despite the presence of this accessory parathyroid tissue the serum calcium still falls far short of normal. There is a very significant difference between the serum-calcium levels of the so-called chronic tetany, with a mean of 8·9 mg. per 100 c.cm., and of the normals published previously (Robertson 1941a) with a mean of 10·39 mg. ($t = 3{\cdot}32$; $P < 0{\cdot}01$).

DISCUSSION

Thyrotoxicosis is associated with an excessive calcium excretion, which may lead to an osteoporosis, and a normal calcium absorption. The calcium excretion falls to normal with the cure of the thyrotoxicosis. In parathyroid tetany a diminished secretion of parathyroid hormone causes the serum calcium to fall and this is associated with a diminished calcium excretion and a

TABLE VI—SPONTANEOUS REGENERATION OF PARATHYROID TISSUE. SERUM-CALCIUM ANALYSES IN POSTABSORPTIVE STATE.

Case	Serum calcium during tetany	Follow-up observations		Treatment, if any
		Since attack of tetany	Serum calcium	
	mg. per 100 c.cm.	months	mg. per 100 c.cm.	
1	7·8	6	9	Oral calcium lactate
6	8·4	40	9·1	Oral calcium lactate
2	7·5	62	9	1 injection of 10 c.cm. Calcium Sandoz intravenously.
8	5·8	30	9	1 injection of 10 c.cm. Calcium Sandoz intravenously.
3	8·6	2	10·4	Oral calcium lactate
9	7·7	1	9·6	None
4	6·3	7	7·5	Oral calcium lactate
10	7·5	1	8	Oral calcium lactate
7	5·9	12	9	Oral calcium lactate
5	3·4	9	8	Oral calcium lactate
11	4·5	22	7·7	Oral calcium lactate
12	8·7	3	10·2	None
Mean	6·8	..	8·9	—

normal absorption. Treatment of parathyroid tetany aims at raising the low serum calcium and this should be achieved by some mechanism similar in nature to that of parathyroid hormone which controls the release of calcium from the skeleton to the blood-stream. The raising of the serum calcium in tetany by large doses of calcium salts appears to be wrong in principle.

When however parathyroid tetany complicates subtotal thyroidectomy for the relief of thyrotoxicosis the treatment should take into account two factors. First, a demineralised skeleton in need of calcium, and a serum calcium requiring elevation. Large doses of calcium meets the first demand, but the second is not so simple. The disadvantages of injections of parathyroid hormone have already been referred to; thyroid feeding has been shown to lower still further the diminished serum calcium; the action of calcium salts is only transitory; therapeutic doses of ammonium chloride while producing a mild acidosis were found not to raise the serum calcium. The administration of a low phosphorus diet has been clearly shown by Shelling and Goodman (1934) and Anderson and Lyall (1939), among others, to be very efficacious in raising the diminished serum calcium of tetany. But food restrictions in war-time make it very difficult if not impossible to procure a low phosphorus diet, including as it does fruit, vegetables, white of eggs, carbohydrates and fats. Further, a low phosphorus diet is combined with a high calcium intake of at least 2 g. daily. While this intake of calcium can do no harm to subjects with normally functioning parathyroids, in tetany with damaged parathyroids and a diminished calcium excretion it would lead to an unnecessary storage of calcium. Some observations reported in this paper confirm (Himsworth and Maizels's findings in 1940) that vitamin D (calciferol) can raise the reduced serum calcium of parathyroid tetany. When given in adequate doses of 100,000 I.U. daily it raised the serum calcium despite a low calcium and high phosphorus content of the diet (i.e. case L in tables I and V). In view of the nature of the disturbed calcium metabolism in cured thyrotoxicosis and parathyroid tetany, when these diseases occur in the same patient a suggested line of treatment would be as follows.

1. Large doses of calcium, such as 7 g. of the carbonate or 22·5 g. of the lactate daily, should be given for about a year postoperatively to correct the demineralisation resulting from the thyrotoxicosis.

2. The calcium intake should then be reduced to normal requirements (0·7–1 g. daily) and calcæmic doses of vitamin D given (60,000–200,000 I.U. daily according to McLean (1941). The action of vitamin D in such doses resembles that of parathyroid hormone in supplying calcium to the blood-stream from the bones. The serum calcium can be determined from time to time, thus ensuring that no hypercalcæmia results.

In determining the effect of various therapeutic agents on the serum-calcium level in parathyroid tetany account must be taken of regeneration of, or the presence of

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accessory, parathyroid tissue. These factors appear to come into play during the year after the attack of tetany. For comparative studies the blood for calcium estimation should be withdrawn at standard times in relation to food and medicines.

SUMMARY

A series of seven cases of parathyroid tetany of 3½–11 years' duration have been investigated.

Thyroid feeding depressed the serum calcium and had no effect on the serum inorganic phosphorus. The serum phosphatase was diminished in tetany and thyroid feeding raised it to normal.

The ingestion of 3 g. of calcium daily, as the lactate, chloride or phosphate, for two weeks produced no significant changes in the serum calcium or inorganic phosphorus.

Significant elevations of the serum calcium were found two hours after the ingestion of calcium lactate and carbonate. Calcium phosphate produced no significant rise in the serum-calcium level. The ability to raise a depressed serum calcium appears to depend not on the solubility of the calcium ingested but on its acid radicle.

Ammonium chloride in doses of 3 g. daily for two weeks produced a mild acidosis, but was without effect on the serum calcium or inorganic phosphorus.

Vitamin D (calciferol) in doses of 100,000 international units daily for two weeks produced very significant elevations in the serum calcium and was without effect on the inorganic phosphorus.

After an attack of parathyroid tetany parathyroid tissue seems to regenerate. Despite this regeneration or the presence of accessory parathyroid tissue the serum calcium still falls far short of normal.

The treatment of parathyroid tetany when it complicates the cure of thyrotoxicosis should include the ingestion of large doses of calcium salts only until the decalcification of thyrotoxicosis has been corrected. Thereafter the treatment should aim at imitating the action of parathyroid hormone. Vitamin D (calciferol) in adequate or calcæmic doses had such a therapeutic effect.

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REFERENCES

Albright, F., Bauer, W., Ropos, M. and Aub, J. C. (1929) *J. clin. Invest.* **7**, 139.
Anderson, J. A. and Lyall, A. (1939) *Quart. J. med.* **8**, 204.
Aub, Albright, Bauer and Rossmeisl, E. (1932) *J. clin. Invest.* **11**, 211.
Bauer and Ropes (1926) *J. Amer. med. Ass.* **87**, 1902.
Boyd, T. E., Austin, W. C. and Ducey, E. F. (1926) *Amer. J. Physiol.* **77**, 225.
Collip, J. B. (1925) *J. biol. chem.* **63**, 395.
Dragstadt, L. K. and Peacock, S. C. (1923) *Amer. J. Physiol.* **64**, 424.
Ellsworth, R. (1933) *Bull. Johns Hopk. Hosp.* **52**, 131.
Freeman, S., Kant, E. R. and Ivy, A. C. (1935) *J. biol. Chem.* **112**, 1.
Greenberg, D. M. and Gunther, L. (1932) *Arch. intern. med.* **50**, 855.
Greenwald, I. (1929) *J. biol. Chem.* **82**, 717.
— and Gross, J. (1925) *Ibid*, **66**, 185.
— — (1929) *Ibid*, **82**, 531.
Hanson, A. M. (1923) *Milit. Surg.* **52**, 280.
Hess, H. F., Benjamin, H. R. and Gross, J. (1931) *J. biol. Chem.* **94**, 1.
Himsworth, H. B. and Maizels, M. (1940) *Lancet*, **1**, 959.
Holtz, F. (1933) *Arch. klin. Chem.* **177**, 32.
Hunter, D. (1930) *Lancet*, **1**, 947.
Inouye, T. (1924) *Amer. J. Physiol.* **70**, 524.
Jones, J. H. and Rapoport, M. (1931) *J. biol. Chem.* **93**, 153.
Kunde, M. M., Oslund, R. and Kern, R. (1928) *Amer. J. Physiol.* **85**, 387.
— — — (1931) *Ibid*, **96**, 45.
McLean, F. C. (1941) *J. Amer. med. Ass.* **117**, 609.
Means, J. H. (1937) The Thyroid and its Diseases, London.
Robertson, J. D. (1941a) *Lancet*, **1**, 97.
— (1941b) *Ibid*, p. 129.
— (1941c) *Ibid*, p. 156.
Salvesen, H. A., Hastings, A. B. and McIntosh, J. F. (1924) *J. biol. Chem.* **60**, 327.
Shelling, D. H. (1931) *Ibid*, **96**, 215.
— (1935) Parathyroids in Health and Disease, London.
— and Goodman, M. J. (1934) *Jour. Amer. med. Ass.* **102**, 669.
Smith, R. G. and Steinberger, H. R. (1932) *J. biol. Chem.* **96**, 245.
Van Slyke, D. D. (1917) *Ibid*, **30**, 347.
Wilson, D. W., Stearns, T. and Janney, J. H. (1915) *Ibid*, **21**, 169.

ASSOCIATION OF SCIENTIFIC WORKERS.—This society is holding a conference on science and the war effort at the Caxton Hall, Westminster, on Jan. 10 and 11. Further information may be had from the conference secretaries of the association, 30, Bedford Row, London, W.C.1.

RESECTION OF HEAD OF PANCREAS AND DUODENUM FOR CARCINOMA

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THE first successful resection of the duodenum and a portion of the pancreas for carcinoma involving the ampulla of Vater and adjacent pancreatic head was reported by Whipple, Parsons and Mullins (1935). Later, Whipple (1938) collected and reported on 11 cases in which duodenectomy and partial pancreatectomy had been performed for malignant growths localised to the lower reaches of the common bile-duct or to the head of the pancreas, and of these 6 survived operation.

The operations were, in many essential respects, similar two-stage procedures. At the first operation, biliary obstruction was overcome by anastomosing the gall-bladder to the stomach or to a loop of proximal jejunum, after which a posterior gastrojejunostomy was performed. The first operation was completed by ligating the supraduodenal portion of the common bile-duct and by tying the gastroduodenal artery in continuity in order to diminish the blood-supply to the carcinomatous area. After an interval of 2–3 weeks, by which time it was hoped that the patient would show an all-round improvement following an intensive course of treatment, the second operation was carried out. This consisted in thoroughly mobilising the duodenum and the head of the pancreas by Kocher's method, transecting the antrum of the stomach close to the pyloric ring or dividing the beginning of the duodenum between crushing clamps, after which the distal part of the third portion of the duodenum was divided between enterotomes, and a generous wedge-shaped area of the head of the pancreas, or maybe the entire head, up to or including its attenuated neck, was cut away together with the attached and now liberated U-shaped duodenum. After this wide resection the proximal and distal duodenal stumps embraced by the enterotomes were oversewn with silk and securely invaginated with purse-string sutures. The duct of Wirsung was, as a rule, picked up and ligatured, the oozing cut surface of the pancreas oversewn with a continuous locking stitch and then finally sealed off with an omental graft. The operative field was drained with a strip of corrugated rubber, a Penrose tube, or a piece of guttered plastic glass. In some of the cases the abdominal incision was closed with a series of through-and-through interrupted sutures of stainless alloy steel wire to guard against the possibility of dehiscence of the wound or post-operative eventration.

Orr (1941) gives a detailed and tabulated account of all the cases which have been reported to date. Of the 15 patients subjected to these two-stage radical excisions, 5 (33·3%) died as a result of the operation, while of the remaining 10 patients, 3 later succumbed to metastatic implants in the liver, 2 from stenosis of the stoma which had been fashioned between the gall-bladder and the stomach or between the gall-bladder and a loop of proximal jejunum, and 1 from bile peritonitis. Only 4 were alive at the time of his publication. These figures are so disheartening that one may well ask if such heroic measures as partial pancreatectomy and duodenectomy for carcinoma are, in fact, justifiable. On the other hand, it is well to remember that many of the tumours of the head of the pancreas and of the ampulla of Vater are localised and resectable even at the time of the patient's death; that 60% show no evidence of metastases at operation or at autopsy; that the majority are lethargic in growth and are comparatively benign in character; and that in the present state of our knowledge radical resection offers the only hope of cure.

In my opinion, success in this difficult field of visceral surgery is not likely to be achieved in the future unless cases of obstructive jaundice are submitted to inquiry by operation more promptly than obtains at the present time, and until the technical details of the two-stage procedure, as so accurately described by Whipple (1938), Brunschwig (1937), Illingworth (1939), Moreland and Freeman (1941), and Ransom (1938) are thoroughly mastered by abdominal surgeons. Illingworth (1939) was the first British surgeon to publish a case of resection of the duodenum and head of the pancreas by this two-

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stage method. His patient, after putting up a splendid fight, died from bile peritonitis on the 43rd post-operative day.

The following is an account of a case of carcinoma of the ampulla of Vater, in which during the performance of a straightforward cholecystectomy for cholesterosis and gall-stones a small cancer of the terminal part of the common bile-duct unfortunately escaped detection; but 6 months later it was possible to restore the patient to health by the radical two-stage procedure.

CASE-HISTORY

A married woman, aged 53, was admitted to the Southend General Hospital on May 10, 1940, complaining of flatulent dyspepsia and attacks of bilious vomiting. She stated that for some 2–3 months she had suffered from wind and a feeling of distension after meals and that there would be a dull aching pain in the pit of the stomach or below the right rib, which at times passed through the centre of the back. There was no history of jaundice or attacks of biliary colic, although about ten days before admission she had had what she described as a bilious attack for 2 days, during which time she vomited large amounts of frothy, yellow-stained fluid. Her bowels worked regularly and the motions were dark brown in colour. There were no symptoms referable to the urinary or genital tracts. She was a sallow thin patient in good condition; heart and lungs clear; some tenderness in the region of the gall-bladder which, however, was not palpable. No mass could be detected in the abdomen. Rectal and vaginal examinations were negative. A complete blood investigation showed a slight degree of secondary anæmia. No abnormal constituent could be detected in the urine. A Graham dye-test supported the diagnosis of chronic cholecystitis associated with gall-stones. A barium meal X-ray examination was not carried out, nor were specimens of the stools tested for occult blood.

First operation: cholecystectomy.—On May 22 the abdomen was explored through a right subcostal muscle-splitting incision. The stomach was normal; there was no evidence of duodenal ulcer; the gall-bladder appeared normal but contained three small stones. After displaying the three ducts, a retrograde cholecystectomy was undertaken. As the biliary passages appeared healthy and contained no calculus, they were not probed nor was the head of the pancreas or the second portion of the duodenum examined. The abdominal incision was approximated in the usual manner and a rubber drain was led down to the stump of the cystic duct. The excised gall-bladder was slit open and examined. It was a typical strawberry gall-bladder containing three cholesterol stones. Postoperative convalescence was stormy and in spite of gastric aspiration with a Ryle's tube the patient had several bouts of intractable vomiting. She rapidly became dehydrated and emaciated in spite of intravenous infusions and other supportive measures including blood-transfusions. A barium meal X-ray examination was attempted but this failed in its object as the patient collapsed during the screening. Shortly after this she improved slowly, the vomiting ceased altogether, she gained in weight, and was eventually discharged to a convalescent home on June 16.

She was readmitted to the General Hospital on Dec. 6, 1940, nearly 6 months later. According to the case sheet, three weeks after leaving hospital she had had another attack of abdominal pain and this was followed by vomiting. The attacks became recurrent, 12 days being the longest free period. In the attacks she got gradually increasing distension of the upper abdomen, accompanied by colicky pain; then she would vomit large quantities of bitter fluid. She had recognised food taken on the previous day in the vomited material. She said she had lost 1½ st. in weight in 4 months and that she was steadily going downhill. She was pale, thin and weary; heart and lungs clear; blood-pressure 110/70 mm. Hg. Abdomen: scar sound, but much epigastric distension and gurgling and splashing sounds elicited on palpation. No mass felt. Nothing abnormal discovered in the pelvis. Blood examination showed a fairly severe microcytic anæmia. The urine was free of bile, but contained a trace of albumin. Barium meal X-ray examination: stomach and duodenum distended, with an appearance suggesting either a filling-defect due to neoplasm in the second part of duodenum, or an obstruction due to bands.

Second operation: gastrojejunostomy and duodenotomy.—On Dec. 8 the abdomen was opened through a long right upper transrectus muscle-splitting incision. It was at once evident that satisfactory exploration was impossible until the bloated stomach, which occupied the entire upper abdomen, was deflated. The anæsthetist was accordingly instructed to pass a small Ryle's tube through the nostril into the stomach, and when this was done the viscus immediately collapsed. The first and second parts of the duodenum were much distended and the muscular coats hypertrophied. On invaginating the anterior wall of the second portion of the duodenum opposite the papilla of Vater, a circular ulcer with a diameter of approximately 1 in. and with hard everted rolled-over edges could be felt projecting into the lumen of the gut. The tumour mass could be traced to the adjacent portion of the head of the pancreas which was of metallic hardness and inflexible. The whole tumour could, however, be pulled upwards and moved freely from side to side, and did not appear to be anchored to the vulnerable inferior vena cava. The anterior wall of the second portion of the duodenum was incised for 2 in., and after retracting the edges of the gut with Allis forceps and sucking out the contents of the duodenum with a suction tube a good view of the interior of the duodenum with its contained cancerous ulcer could be obtained. The duodenotomy incision was then closed with a three-tier suture and a posterior gastrojejunostomy with a vertical stoma was fashioned without the aid of clamps. No enlarged lymph-nodes could be felt in the region of the growth, and the liver surface was smooth and even. The common bile-duct was moderately distended, and I was tempted to complete the first stage of the operation by anastomosing the choledochus to the small intestine. However, after the gastrojejunostomy the patient was in poor condition, so the abdominal incision was closed expeditiously with a series of interrupted floss silk sutures. The gastroduodenal artery was not ligated in continuity nor was a fragment of the tumour removed for microscopic investigation. The patient had an uneventful convalescence after the first-stage operation and was able to take fluids and semi-fluid nourishment without restraint; but towards the end of the second postoperative week the conjunctivæ became noticeably tinted with bile and the motions were putty-coloured.

Third operation: excision of duodenum and head of pancreas, choledochojejunostomy and entero-anastomosis.—On Dec. 28 the previous vertical epigastric incision was reopened and the silk sutures were removed. The pylorus and the first, second and third parts of the duodenum were liberally freed and mobilised. The portal vein was exposed and a number of tributaries were found running into it from the first and second parts of the duodenum. Some of these veins were very large and thin-walled. Each was ligatured in two places with fine silk, and then divided. The pyloric antrum was transected between clamps and the proximal end of the stomach invaginated and buttressed with adjacent omentum. The common bile-duct, which was about the size of my middle finger, was cut across low down between hæmostats, and the duodenum and the growth were freed from the right side and pulled over to the left (medially) together with the head of the pancreas. The neck of the pancreas was then divided between hæmostats, and the remaining stump was oversewn and covered with an omental graft. The third part of the duodenum towards the duodenojejunal flexure was severed between the crushing forceps, and the distal end invaginated with a silk purse-string stitch. The growth, the duodenum and the head of the pancreas were then removed intact. A loop of proximal jejunum some 18 in. below the previous gastrojejunostomy was brought up over the transverse colon to the cut end of the common bile-duct and an end-to-side anastomosis was performed, two layers of continuous sutures of fine silk being used. After this a small side-to-side anastomosis between the ascending and descending limbs of jejunum was made to deflect the intestinal contents away from the biliary passages.

The operative field was drained with a large piece of corrugated rubber and the abdominal incision drawn together with interrupted sutures of floss silk and deknatel. The ducts of the pancreas were not specifically seen after the neck of the gland was transected, but were merely oversewn with a running mattress suture and protected with a pad of omentum.

Postoperative progress.—It took the patient about 6 weeks to recover from this operation. The abdominal wound became infected and there was considerable discharge of thin purulent fluid through the lower portion of the incision. After extraction of the silk sutures the wound slowly healed, leaving a raised keloid scar. The jaundice subsided in the third postoperative week. The stools were pale brown and semi-fluid for about 17 days, but after that they were well-formed,

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dark brown and inoffensive. There was no diarrhœa. The patient was given an alkaline mixture containing iron and arsenic 3 times a day; pancreatic extracts; and a semi-solid diet rich in fats, sugars and the essential vitamins. She slowly gained in weight, and was discharged from hospital on Feb. 6, 1941. She was re-examined on June 31, when she was well, had gained a stone, and was doing her own cooking. On Aug. 6 the surgical registrar saw her and stated that she was looking well. The stools were formed, she was taking pancreatic extract and having only one bowel action a day with the aid of paraffin.

Pathologist's report.—The specimen consists of the pyloric end of the stomach, the first, second and about half of the third portion of the duodenum, and the whole head of the pancreas, a portion of the neck of the gland and the lower portion of the common bile-duct. There is a circular malignant ulcer with a diameter of approximately ¾ in. occupying the second part of the duodenum and involving the papilla, the ampulla of Vater and the adjacent head of the pancreas. A probe can be passed through the common duct and then through the centre of the base of the malignant crater. The carcinomatous process appears to have begun either in the ampulla of Vater or in the papilla itself. On microscopical examination, the growth was a columnar-celled, tubular carcinoma, exact site of origin doubtful. Only a small area of pancreas was involved in the malignant process.

SUMMARY

The first successful resection of the duodenum and of the whole or a portion of the head of the pancreas including the neck, for carcinoma involving the lower reaches of the common bile-duct and adjacent pancreatic head, was reported in 1935.

Since then only 15 patients have been subjected to two-stage radical excisions. These consisted of a preliminary cholecysto-enterostomy or choledocho-enterostomy combined with gastrojejunostomy and followed some two weeks later by a wide resection of the duodenum and the head of the pancreas.

Of these 15 patients, 5 died as a result of the operation, while of the remaining 10 patients, 3 later died from metastases in the liver, 2 from stenosis of the stoma which had been fashioned between the gall-bladder and the stomach or between the gall-bladder and a loop of proximal jejunum, and 1 from bile peritonitis. Only 4 are alive today.

Only 1 case of successful resection of the duodenum and a portion of the pancreas involving the ampulla of Vater for carcinoma has been reported in Britain. This patient died on the 43rd postoperative day from general peritonitis.

An account is here given of the radical treatment of cancer of the head of the pancreas and of the ampulla of Vater by the two-stage procedure, and a case-report is presented. The patient enjoyed fairly good health for nine months, but died from implants in the liver eleven months after the last operation.

REFERENCES

Brunschwig, A. (1937) *Surg. Gynec. Obstet.* 65, 681.
Illingworth, C. F. W. (1939) *Edinb. med. J.* 46, 331.
Moreland, R. B. and Freeman, B. S. (1941) *Surgery*, 9, 712.
Ransom, H. K. (1938) *Amer. J. Surg.* 40, 264.
Orr, T. G. (1941), *Surg. Gynec. Obstet.* 73, 240.
Whipple, A. O. (1938) *Amer. J. Surg.* 40, 260.
— Parsons, W. B. and Mullins, C. R. (1935) *Ann. Surg.* 102, 763.

Reviews of Books

Conditioned Reflexes and Psychiatry

Vol. II.[1] IVAN PETROVITCH PAVLOV, late director of the physiological laboratories of the Institute of Experimental Medicine, Leningrad. Translated and edited by W. HORSLEY GANTT, M.D. London: Lawrence and Wishart. Pp. 199. 8*s.* 6*d.*

FEW psychiatrists have appreciated the zest and thoroughness with which Pavlov applied himself to the study of their problems in the last eight years of his life. His physiological method was valid for this field too, he believed, and he set himself to apply the lessons learned by animal experiment to the abnormal behaviour of human beings, so variously interpreted by psychologists. The scattered lectures and articles in which his arguments and conclusions were advanced are now brought together; whether they can help the clinician to do his work better or can stimulate fruitful research is still a doubtful question, but the brilliance and honesty of the attempt are beyond dispute. No-one would guess from internal evidence that these were the writings of a man who had been unacquainted with clinical psychiatry until he applied himself to it at the beginning of his ninth decade. In 1930 he spoke of the need to promote "the natural and unavoidable approximation and final fusion of psychology with physiology, the subjective with the objective. . . . The most common example of this blending obviously exists in mental diseases." He therefore made it his business to see a great many psychiatric cases, but he did not make vain pretensions; thus in 1934 he wrote "I am no clinician—I have been and remain a physiologist—and, of course, at present, so late in life, would have neither the time nor the possibility to become one." Clinical psychiatrists will none the less learn from his suggestions. The book follows on the "Lectures on Conditioned Reflexes," and the two volumes contain all Pavlov's published lectures from 1903 until his death. The translation has been admirably done by Dr. Horsley Gantt, whose years of study and friendship with Pavlov qualify him for the task. Dr. Gantt has written, as an introduction, a critical appreciation and biographical sketch of Pavlov's closing years which is vivid and just.

1. Volume I, which has been out of print, is now also available. (Price 12*s.* 6*d.*

Ophthalmic Nursing

(3rd ed.) MAURICE H. WHITING, M.B. Camb. F.R.C.S. London: J. and A. Churchill. Pp. 157. 6*s.*

THE new edition of this popular book should be specially useful in training nurses without previous experience of ophthalmic work. The early chapters on anatomy and physiology are concise but sufficient, except perhaps that a fuller description of the orbit would help to clarify the relations of the eye and the nose. The second half of the book gives sound advice on the nursing of operative and non-operative cases, and on theatre technique, but there are one or two omissions; for example, the actual technique for obtaining a conjunctival culture is not explained, and the nurse is not told how and when to sterilise ocular drops and lotions. The upkeep and care of special instruments such as the tonometer, perimeter, slit-lamp and Edridge Green lantern should be included, since these are maintained by the outpatient nurse, and a description of the ring or Haab giant magnet would add to the interest of the book. More emphasis might have been laid on the importance of knowing the type of injury commonly associated with an intraocular foreign body, and a busy staff nurse would welcome a more convenient way of examining the eyes of an obstreperous child than the one described. The section on the value of sulphonamides might mention their curative value in hypopyon ulcer. Gas injuries of the eye based on experience in the last war are well described, but it is a pity that nothing is said of injuries caused by incendiary and explosive bombs in this one.

A Textbook of Physiology

(7th ed.) W. D. ZOETHOUT, Ph.D., and W. W. TUTTLE, Ph.D. London: Henry Kimpton. Pp. 743. 22*s.* 6*d.*

THIS American book has deservedly run through many editions; it is a complete elementary review of physiology and takes in such aspects of general and chemical physiology and histology as are necessary. It has been kept well up to date, and the illustrations, a mixture of the new and the rather old-fashioned, are instructive. The chapters are introduced by a list of cross references to related topics, the derivation of new terms is indicated, and at the end are a glossary of technical terms and a list of prefixes and suffixes. The work fully meets the needs of those studying physiology up to a standard somewhat lower than that required of medical students; but the balance of the book is so good that it would serve admirably as a jumping off place for independent folk who like to cull their knowledge from various sources.

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THE LANCET

LONDON: SATURDAY, DECEMBER 27, 1941

WHEN DOC MEETS DOC

"It isn't the prescription that I give," said a great physician, "but the pat on the shoulder with which I give it."

"There is one thing at which the G.P. is supreme, and that is psychology."

"That eyewash, suggestion, or what-you-will that does the ordinary patient a power of good."

THUS among ourselves do we describe, in varying terms, that aptitude for handling the sick man's mind which TROTTER included among the attainments of the good doctor. As we grow older we tend to play upon it; we have said the same thing so often and still have to say it again, and say it as though it were entirely new and the product of the most recent research. One will sit down slowly in his chair looking at the window while he glances at the patient to see that his mind is tuned in to the oracle and will blurt it out or slowly roll it over his tongue according to his judgment of the patient's mentality. Another will wash his hands and begin as he picks up the towel, finally bringing out his most impressive sentence as he puts it down again with a little jerk. As we pocket our fee we may think what an old scoundrel we have been, but one day, being tired or pressed for time, we omit some part of our technique and fail to get our advice across. So the by-play is an essential adjunct to the advice. This is with the ordinary patient; but what when the patient is a doctor? All must then go by the board. The doctor knows the tricks of his neighbour's trade; he has too often seen that flick of the towel and may even have copied it himself. Then it is apt to be: "Well, old man, you might try such and such, though I don't suppose it really does any good," or "By all means have some radiotherapy, though as you know it has no specific action on the tissues"—plain, unadulterated science with no art to back it up.

Should this be so? The doctor is as human as anyone else, with fears and anxieties of which the layman knows nothing and which are more difficult to allay. The successful doctors' doctor must use another and a more tedious technique. This is likely to include a great expenditure of time, a repetition of examination, a lengthy critical discussion in an undertone, and a complete absence of all those trivialities which some call humbug—the very characteristics, in fact, which do not attract the ordinary patient. Every teaching hospital carries on its staff one man who knows this technique to perfection, but knows no other. Such a man has but little practice, though doctors flock to him when wives and children's lives are at stake. Many a doctor owes the life of his wife or firstborn to him and yet has never been able to send him a paying patient. He is fortunate if he has private means, for man cannot live on gratitude and presentation silverware alone.

This relationship of doctor to doctor may be fraught with risk. A frightened junior may ask his senior about some lesion at that time slight but with grave potentialities. Thus a young surgeon pricked his thumb when doing an acute streptococcal mastoid. Next day an ominous red line had reached his wrist, and he said casually to his chief "Look at this; would you lie up with it?"—and his chief as casually replied "I shouldn't." He did not realise that that young man was frightened for his life, but was more afraid to show it, and this was his way of asking his chief to be his doctor. A junior at two hospitals asked two seniors to wash out his antrum from time to time; and each did so thinking the other was in charge of the case and that he was merely doing a bit of handicraft to help. An acute pan-sinusitis supervened with septicæmia. No tragedy came of these cases, but there have been others—not always on the surgical side and not always in hospital—where a young doctor's life has been cut short because he has had no real medical attention at all. The moral is this. Refuse to discuss a doctor's ailment with him unless you are being asked to treat him. But if you are, don't let him share the responsibility; treat him as you would any other patient. And when you yourself are ailing choose your doctor as decisively as you choose your solicitor, and put yourself as unreservedly in his hands.

HEAD INJURIES

JUDGING by the amount being written about them there is a growing realisation of the importance of head injuries, so that these cases may no longer be stuck away in the corner of a hospital ward as something of a nuisance and left to run their course. The total number of head injuries resulting from air-raids has been nothing like as large as was expected, but SHEPHERD found 14% of such injuries in a series of 245 air-raid casualties reported on another page, a heavier incidence than in any other regional group, and the increase in road accidents brought about by war-time motoring has accounted for many more cases. Much can be done in the way of prevention. Protective headgear for the fighting man went out of fashion with the transition from hand-to-hand combat to the lead and steel missile, but the reappearance of the steel helmet in the last war undoubtedly saved many casualties. In less serious pursuits, American footballers have for long worn a padded leather helmet to lessen the incidence of concussion in that robust game, and from the speedway and dirt-track we learned the virtues of the crash helmet, especially for motor-cyclists. CAIRNS's studies in this war are a cogent argument for insisting that all motor-cyclists should adopt this simple and efficient protection. Industrialists have been slow to learn these lessons, but MILLER[1] reports that the incidence of head injuries among the South African miners has been greatly reduced by the adoption of the "hard hat," and the fashion will doubtless spread among other classes engaged in dangerous occupations. The appalling number of road accidents demands, even in these times, a more vigorous and persistent propaganda campaign for safer use of the roads by motorist, cyclist and pedestrian alike.

Most recent writers emphasise the importance of proper treatment of the scalp wound. Too often these wounds suppurate, with grave or even fatal complications. Adequate excision and thorough cleansing are first principles, but the possibility must

1. Miller, L. E. *Sth Afr. med. J.* 1941, **15**, 331.

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be borne in mind that an apparently trivial scalp wound hides a penetrating wound of the skull or brain for which something more is required, and a good case can be made for X-ray examination in every case not obviously a simple laceration. A problem as yet unsolved is the correct treatment of traumatic cerebrospinal rhinorrhœa, usually resulting from a fracture through the frontal or ethmoidal air sinuses. O'CONNELL [2] considers that immediate closure of the fistula is not necessary, and the natural barrier formed by the scar is at least as good protection against infection from the air sinuses as is an artificial closure reinforced with a fascial graft. Others have had the unhappy experience of meningitis arising in the early days after the injury, perhaps while spontaneous closure is being hopefully awaited, and in some of these cases chemotherapy will not save the patient's life. There are cases too of a fistula apparently closing spontaneously, only to leak again some weeks or months later, and a fulminating meningitis may be fatal before treatment can be instituted. Because of these risks some maintain that early closure of the fistula is preferable to the uncertainty of spontaneous healing. No single person's experience is yet large enough to justify definite pronouncement, but if the centres dealing with large numbers of head injuries are keeping records and following these patients the answer should be forthcoming in a few years. The treatment of compound fractures of the vault is more generally agreed on, but the same cannot be said about what should happen to a foreign body lodged at some depth in the brain. There seems no doubt that unless the search can be made by someone accustomed to the technique it is better not made at all. Even in the hands of specialists more harm and disability may result from removing a foreign body than from leaving it where it is. Individual cases will have to be dealt with on their merits, with the balance weighted in favour of conservatism.

Not enough has yet been said about rehabilitation. There are special centres for dealing with head injuries and their sequels in the military population, but the problem in these cases is often complex and not strictly applicable to civil life. There is a need for similar centres for civilian injuries, and the insurance companies might find it to their advantage to make a start in this direction. The present machinery of litigation and compensation often perpetuates the invalidism from these as from other injuries, and a rehabilitation centre should be able to give decisions which would shorten the period of invalidism. Apart from such institutional treatment we need to get away from the rule-of-thumb treatment of concussion—some cases need only three days in bed, while others may require three weeks or longer, depending on the individual's reaction to the injury. The lay public needs to be weaned from the idea that a person who has had a fractured skull is necessarily maimed, mentally or physically. With this belief would go the darkened room and the dark glasses, and the whole panoply of a mental illness. If the patient recovers from the injury without gross cerebral damage he should be expected to make a fairly complete mental and physical recovery. Anything short of that in the great majority of cases would imply faulty management in the early stages of convalescence.

2. O'Connell, J. E. A. *Lancet*, Dec. 13, 1941, p. 719.

REFRACTORY ANÆMIA

WHEN the hæmopoietic property of liver extracts and the proper use of iron salts were firmly established it seemed as if treatment of the primary blood disorders would henceforth be simple and satisfactory. From the first it was recognised that leukæmia and the classical aplastic anæmia had to be excluded and that certain hæmolytic anæmias required special treatment; but these were a minority. The pathologist's report showing an anæmia with a high colour-index was thus the signal for liver extracts and a favourable prognosis. Mostly this optimistic forecast was fulfilled, but sometimes the response was disappointing—liver extracts were changed, iron was given, in the end blood-transfusion was usually needed and the outlook was gloomy. These unfortunate patients were in such striking contrast to those who responded normally to treatment that they were soon noticed and reports of "pernicious anæmia refractory to liver treatment" began to appear. In 1936 ISRAËLS and WILKINSON [1] showed that there was in fact a group of patients in whom the clinical features, blood-picture, and histological changes in the bone-marrow closely resembled pernicious anæmia but who, in varying degrees of completeness, failed to respond to liver extracts of tested potency; a notable point was that achlorhydria, so typical of true pernicious anæmia, was not present. This group was named achrestic anæmia and later [2] it was reported that sternal-marrow biopsies studied by the dry-smear technique were also of the pernicious-anæmia type with megaloblastic hyperplasia. Other writers have reported patients in whom a normoblastic hyperplasia of the marrow was found and who similarly failed to respond to treatment; this anæmia was sometimes called "pseudoaplastic."

The same problem forced itself on the attention of workers at the Rockefeller Institute in New York and in 1939 C. P. RHOADS [3] summarised the conclusions reached. After all anæmias which could be attributed to cancer, Hodgkin's disease, nephritis, cirrhosis of the liver or leukæmia had been rigidly excluded, there remained a group of primary anæmias whose course did not respond to any of the standard treatments; these were intensively studied and a full report has recently been given by BOMFORD and RHOADS [4] on 66 such cases. The natural history was carefully noted; the histology of the bone-marrow was studied by sternal biopsy and at autopsy; fractional gastric analyses were made; changes in the urobilinogen excretion were used to estimate liver function; porphyrin excretion was studied and the copro-porphyrin isomers were isolated in 6 cases; the excretion of glucuronates was used as a measure of "detoxifying capacity"; some other tests were applied as well. Yet the picture presented by all this detail is confused, if not chaotic. A not very successful attempt has been made to classify the cases according to the histological changes in the marrow. It is possible that use of the dry-smear sternal-puncture technique, adopted by several hæmatologists with encouraging results, might have made this classification more precise; but it is clear that pathological

1. Israëls, M. C. G. and Wilkinson, J. F. *Quart. J. Med.* 1936, 5, 69.
2. *Ibid*, 1940, 9, 163.
3. Rhoads, C. P. Symposium on the blood and blood-forming organs, University of Wisconsin, Madison, 1939, p. 31.
4. Bomford, R. R. and Rhoads, *Quart. J. Med.* 1941, 10, 175 and 235.

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changes in the bone-marrow are only part of the story. Discussion of the relative value of all this evidence must still be left to the expert, but it is useful to see what impressions have been gathered about the ætiology of these cases and what practical experience has taught about their management.

RHOADS is struck by the resemblance between the refractory anæmias and those anæmias, whose course is also independent of treatment, which are known to be due to exposure to "potentially hæmotoxic" aromatic hydrocarbons, and included in the reported series are 34 cases of refractory anæmia in which the patient had been exposed to benzol, paraphenylenediamine (a hair-dye), analgesics like pyramidon and phenacetin, and some other similar substances. He also recalled that somewhat similar anæmias had been experimentally produced in animals by substances like indol and œstrin. Only a few of the people exposed to these hæmotoxins develop refractory anæmia and it is therefore necessary to postulate a conditioning factor or state. Dietary deficiencies or endocrine disturbances could only be detected in a minority of cases but evidence of liver disturbance or failure of the biochemical mechanisms for detoxicating aromatic hydrocarbons was observed more frequently; an increased rate of hæmolysis was also noted. BOMFORD and RHOADS suggest, as a working hypothesis of the ætiology of refractory anæmia, a conditioned susceptibility to aromatic hydrocarbons to which the patient has been externally exposed or which are being produced in the body itself in the course of normal metabolism; this susceptibility is associated with a disturbance of liver function and detoxicating mechanisms and with the circulation of hæmolytic substances which not only affect the red blood-cells but also their precursors in the bone-marrow. This theory is still too tentative to be applied to treatment which consequently remains empirical and unsatisfactory. Removal from exposure to toxic substances is an obvious measure and should include the abandonment of all sedative drugs containing aromatic hydrocarbons. The diet should be adequate in all respects and supplementing the diet with vitamin-B complex is especially recommended; BUNDING [5] in a recent German report also supports this measure. If sternal puncture shows a negaloblastic marrow it is useful to follow ISRAËLS and WILKINSON'S recommendation to give liver extract—the more refined forms should be avoided. When all this is done the mainstay of treatment is blood-transfusion, which should be repeated as needed since a fair proportion of patients eventually show remissions which may be prolonged and occasionally permanent. Careful cross-matching is essential since the severely anæmic patients are particularly liable to post-transfusion reactions. BOMFORD and RHOADS believe that transfusions should be used sparingly and are not in favour of raising the hæmoglobin to 70 or 80%—a procedure which has its supporters [6] especially by the method of giving concentrated red cells.[7] Transfusions should be continued however bad the outlook may seem. As it may be necessary to sustain one of these patients with other people's blood for months or even years, the outlook is indeed grim both for patient and doctor, and it is not easy to decide how long it is proper to wait for signs of remission.

Here then are a group of patients whose blood-picture may resemble treatable anæmias but who in practice prove refractory to the known hæmopoietic drugs. Their ætiology is still speculative and their treatment empirical. The doctor can at present do little more than note their occurrence and resolve to be cautious in prognosis until the effect of treatment becomes clear. No patient should, however, be diagnosed as primary refractory anæmia until a thorough survey of the known causes of anæmia has been made.

5. Bunding, A. *Dtsch. med. Wschr.* May 30, 1941, p. 591.
6. Scott, R. B. *Quart. J. Med.* 1939, 8, 127.
7. MacQuaide, D. H. G. and Mollison, P. L. *Brit. med. J.* 1940, 2 555.

HIGH FLYING

A GROUP of Boston workers [1] have again emphasised the difficulties in flying at over 32,000 ft. even when oxygen is supplied. Oxygen constituting as it does a fifth of the atmosphere exerts at sea-level a pressure of 152 mm. Hg, being a fifth of the total atmospheric pressure of 760 mm. Although its absorption into the blood depends on its pressure, it is normally absorbed at a pressure nearer 100 than 152 mm. Hg. This is first because the high water-vapour content of the alveoli cuts down the space available for the remaining atmospheric gases and reduces their total pressure from 760 to about 710 mm. Hg and secondly because whereas in air oxygen would account for 142 of the 710 mm., so much of it has been exchanged in the lungs for carbon dioxide that the remainder exerts little more than 100 mm. pressure. Up to a point, diminished entry of oxygen into the blood causes no symptoms; the acute discomfort of breath-holding is due entirely to the rising alveolar pressure of carbon dioxide, to which the body is extremely sensitive. At low atmospheric pressure, if pulmonary ventilation remained unchanged, two physical conditions would control the gaseous exchange in the alveoli: alveolar air would still be saturated with water vapour which, exerting the same pressure as before, would account for a greater proportion of the total pressure; and the residual pressure would be divided between carbon dioxide, oxygen and nitrogen in the usual alveolar proportions, each of their pressures being reduced. In practice the sensitivity of the body to CO_2 intervenes. The diminished alveolar pressure of this gas allows it to escape more readily from the blood, so reducing the urge to breathe that CO_2 accumulates in the alveoli at the expense of oxygen. In rapid ascents this may lead to the insidious and disastrous results of anoxia. In ascents occupying days acclimatisation occurs, the control of breathing being switched from the CO_2-sensitive to an oxygen-deficiency-sensitive mechanism. This ensures sufficient hyperpnœa to keep the alveolar oxygen pressure as high as it will go, though CO_2 is, of course, lost, and alkali is excreted in the urine to keep the pH of the blood constant. The obvious way to avert anoxia in rapid ascents is to replace the nitrogen of the inspired air with oxygen, so that no matter how much room is taken up in the lungs by retained CO_2, sufficient oxygen is also present to exert an adequate pressure on the blood. At 19,000 ft. when the atmospheric pressure has gone down to 360 mm. Hg nearly half the air breathed must consist of oxygen if the pressure of this gas in the

1. Butler, A. M., Wilson, J. L., Smith, C. A. and Farber, S. *New Engl. J. Med.* 1941, 225, 255.

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alveoli is to reach the normal 100 mm. Hg. It has been suggested that even if this is achieved—so that there should be no stimulus to, or reason for, over breathing—there is excessive elimination of CO_2. This is not confirmed by BUTLER and his colleagues, who working with decompression chambers find that if the alveolar oxygen pressure is kept normal the CO_2 pressure also remains normal and there is no increase in the alkalinity of the urine. They did find however that rapid reductions of atmospheric pressure to 250 mm. Hg or less might give rise to symptoms resembling those of anoxia, though they were not due to this. They attributed these symptoms to liberation of nitrogen or water-vapour bubbles in the tissues—to the same kind of thing, in fact, as occurs in the rapid decompression of divers.

At over 32,000 ft. purely physical considerations begin to determine the limit of performance. Total atmospheric pressure is now only about 200 mm. Hg, of which only 152 mm. are available in the lungs after deducting water-vapour pressure. Thus even if pure oxygen is breathed the maintenance of a normal CO_2 pressure of 40 mm. Hg leaves just sufficient pressure of oxygen to saturate the blood. Above this height, pressure of oxygen inexorably diminishes, though at 40,000 ft. it is theoretically still sufficient to allow an 88% saturation of the blood. But animals exposed to such pressures of pure oxygen die, and ARMSTRONG[2] regarded 30,000 feet as the practical limit of safety. BUTLER and his colleagues point out another hazard when the nitrogen of the air is replaced by oxygen even at low pressure—that of fire, but in civil aviation the deciding factor in altitude is more likely to be the well-known effect of differences in pressure between the atmosphere and the middle ear. It seems that the multiple difficulties associated with very high flight can be overcome satisfactorily only by closed-cabin aircraft in which the atmospheric pressure is something like normal.

Meanwhile attention must be paid to favourable idiosyncrasies which may account for some aviators having a resistance to altitude slightly above the average. On the basis of the remarkable survival of thyroidectomised rats at a barometric pressure sufficiently low to kill all normal rats, BARACH, ECKMAN and MOLOMUT[3] suggest that a low metabolic rate may be an advantage. It is doubtful if they would have obtained such favourable results if they had reduced the temperature as well as the pressure of their exposure chamber so as to imitate more closely the conditions met in flying. Their less sensational finding[4] that twenty cigarettes bind an average of 5·7% of the total O_2-combining power of blood to CO may in practice prove more important, and we await with interest their projected experiments in which these findings are to be correlated with the actual demand of the tissues for oxygen.

2. Armstrong, H. G. Principles and Practice of Aviation Medicine, London, 1939.
3. Barach, A. L., Eckman, M. and Molomut, N. *Amer. J. med. Sci.* 1941, **202**, 336.
4. See also Hartridge, H. *J. Physiol.* 1920, **54**, 152.

THE directors of the Coöperative Wholesale Society Ltd. ask us to state that all national wheatmeal made by their mills is produced strictly in accordance with the specification laid down by the Medical Research Council. The average fibre content of their product, as revealed by analysis over a long period, is less than 0·8%.

Annotations

THE PROPER SCHOOL MEAL

ANYONE disheartened with the slow rate of progress of applied nutritional science in this country will be encouraged by the latest circular (No. 1571) of the Board of Education which sets out not only the principles upon which the provision of school meals should be based, but also the types and quantities of foods which are necessary. The first principle is that in planning a midday meal for school-children it is essential to consider the probable defects of their home diet. This is almost certainly lacking in first-class protein, fat, calcium, iron and the vitamins, and the board aim at making good these deficiencies, at any rate in part. For a dinner to provide about 1000 calories they recommend 20–25 g. of first-class protein, 30 g. of fat, and suitable amounts of vitamins and minerals. The second principle is that the nutritive value and not the low cost of the meal should be the first consideration and the board deplore that there "still are some instances where the authorised allowances of food have not been bought in full owing to a well-meant but mistaken effort to keep the price of the school dinner very low or even to make a profit for sports funds. . . ." Economy, they insist, should be studied "not by reducing the quantity or the quality of the food and staving off hunger with liquids such as soup, but by avoiding waste, by skilled buying and by good cooking." The board might well borrow a leaf from the bulletin of the Children's Nutrition Council and add: "by studying child likes and dislikes, by working within their ambit, and by subtly training the child to eat unwanted but nutritious foods."[1] The low table wastage at Christ's Hospital[2]—less than 1% compared with the average 10%—was achieved by these methods. A third principle is that no child should go without a nutritious midday meal because his parents cannot contribute to the cost. "If it is found that some of the parents cannot pay the full cost of the food the remedy is not to give a poorer meal, but to adjust the income scales so as to provide for meals on part payment, as well as for free meals. . . ."

And lastly there is the principle that cost of supervision and preparation of the meals must not be scamped, for the provision of "balanced meals" needs intelligence and training, and so costs more. "A skilled organising and catering staff is therefore essential and there is no true economy in offering wages too low to attract competent cooks and helpers." We prefer to ask for dietitians (or nutritionists as Americans call them)—though as yet we have trained far too few in this country to meet the demand—for there will be difficulty in interpreting the board's wishes from the lists given, as a guide to the quantities of the main foods to be used. Taking the full range of foods and using the quantity of dried milk allowed, the diet works out at 17 g. of first-class protein, 400 mg. of calcium, 4·3 mg. of iron, 900 I.U. (and possibly more) of vitamin A, 20+I.U. of vitamin D, 0·6 mg. of vitamin B_1 and 19 mg. of vitamin C per meal. This is a satisfactory diet, though the iron is low. But if liquid milk is used instead of dried milk in cooking it appears as though the first-class protein and the calcium will be considerably lower, because the liquid milk allowed is by no means equal to the alternative amount of dried milk. Again it is notoriously difficult to persuade children to eat carrots, cabbage and green vegetables, and it is a temptation to the cook to omit them from the diet and give the children those things which they will eat. Moreover, unless the cook is dietetically minded the menus will tend to become more and more what she herself likes to eat. There must therefore be a skilled dietetic supervision of the menus and of the children's likes and

1. War-Time Bulletin. October and November, 1941.
2. Friend, G. E. The Schoolboy, London, 1935.

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dislikes, and attempts should be made, as in Aberdeen,[1] to induce them to eat unaccustomed but protective foods. The board have recognised that children must be proportionately better fed than adults; but to put this principle into practice they will need dietitians as well as cooks.

ALLERGIC EPILEPSY

EPILEPSY, with its recurring fits, is an obvious candidate for the allergic pigeonhole; and the papers that have been written about the wisdom of this course would themselves fill a good few pigeonholes. A study of these papers induces something of the state of bewilderment produced by a search for truth about current events in war-time. A valiant attack on the subject has recently been made by D. C. Dewar,[3] though one would hardly expect that the patients he investigated—chronic idiopathic epileptics in a mental hospital—would provide the most promising field. Strong prima facie evidence of a connexion between epilepsy and allergy was afforded by his finding that two-thirds of these patients (four times the proportion in a control group) gave either a personal or a family history of allergy, but he does not specify what conditions constitute allergy. To intradermal skin tests he found that 58% of his epileptics, as against 4% of controls, were positive, many of the former showing multiple sensitivity. Offending foods having been eliminated from their diet, twelve epileptics were treated by specific desensitisation. The intramuscular route was adopted, and in half the cases an attempt made to control dosage and avoid the risk of oversensitisation, and consequent increase of fits, by repeated eosinophil counts. Sensitivity tests made at the conclusion of the course of injections and again three months later showed that desensitisation had been achieved in most of the cases. A year later Dewar found that there had been a definite reduction, in one case a most dramatic reduction, in fit incidence in seven of the twelve patients; and the decrease in fits, as well as mental improvement, can be fairly well correlated with the degree of desensitisation. The value of the paper is greatly enhanced by full details of the techniques employed. The treatment of epilepsy as an allergic manifestation is of necessity a painstaking and laborious process; and brilliant results are likely to remain exceptional. Anyone who wishes to try it out should make a detailed study of this paper before he starts.

PHYSICAL TYPE IN PNEUMOCONIOSIS

PEOPLE who are exposed to apparently equal risks from pneumoconiosis-producing dusts do not, of course, all succumb to those hazards. One differentiating factor between the affected and the unaffected might lie in constitutional type, and indeed this view has not only been put forward but to some extent acted on in selecting entrants to the mining industry. The belief is that by excluding certain anthropometric types the incidence of pneumoconiosis, or of pneumoconiosis complicated by tuberculosis, could be reduced. Statistical data have so far been lacking and Aslett, Hart, Martin and Russell[4] give but little encouragement to the hypothesis. Their material is derived from part of the wide survey which has been made in South Wales under the direction of the industrial pulmonary diseases committee of the Medical Research Council. Measurements of 540 workers at an anthracite colliery were available and could be divided into groups of unaffected workers and those with pneumoconiosis of varying degrees. They comprise standing and sitting heights; weight; circumference, anteroposterior diameter, lateral diameter and length of the chest; and radiological measurements. From these various indices have been calculated as well, and comparison is made between the normals and the cases of reticulation, nodulation and major consolidation. The general result of this careful study is that there is little difference in bodily make-up between the affected and the unaffected. For instance, the average height differs negligibly so that there is no reason to think that the normals tend to be the "short and tubby" pyknics and the affected the "tall and thin" asthenics. While one or two of the indices—e.g., height/chest lateral diameter—suggest a slight association between type and reaction to the environment there is clearly no differentiation sufficiently well marked to permit the identification of the future pneumoconiotic case. To avoid recruiting those particularly susceptible to the dust hazard—if they really exist—is, it goes without saying, most desirable. There is, unfortunately, no evidence here that such guidance can be usefully based on bodily measurements.

PARALYSED PAPER

PAPER is badly needed for munitions of war, but most of us would rather do without a meal than give up a book or a packet of letters. It must be done, and done now, as our own contribution to the cause. And there is an added reason for a profession which has its own books and journals. The medical journals are feeling the pinch of paper shortage, and if this shortage becomes worse progress in medicine, and particularly the dissemination of new knowledge, will be held up by difficulty in getting new work published. Doctors themselves can do much to avert this threat, for we are among the larger users of paper and run lawyers a bad second as hoarders of it. Most of the compound celluloses from which our paper is made come from abroad and are not likely to be plentiful while war lasts, but fortunately paper, like currency, can circulate, and our aim must be to keep it circulating. The textbooks of our student days, now of historical interest only, the ledgers of thirty years ago, the incomplete and unbound sets of journals which we could not consult even if we would, these, with the old letters and out-of-date receipts which every literate household possesses, must go to the salvage authorities. A Sunday afternoon of selective rummaging will mean less dust in the home, more room in the attic, and new facts for old.

NOT SO STERILE WATER

MOST hospital bacteriologists are familiar with the non-purulent spinal fluid which on receipt at the laboratory yields a small gram-negative bacillus or other indeterminate organism. They have usually suspected these organisms to be contaminants from the so-called sterile water or saline in which the spinal needle is placed after boiling or with which it is rinsed after sterilisation in an antiseptic fluid. They will therefore be grateful to Professor and Mrs. Wilson Smith for showing by systematic investigation of 223 specimens of cerebrospinal fluid and 11 samples of "sterile water" used for rinsing the spinal needles that two-fifths of the spinal fluids were contaminated and that more than a third of the contaminants probably came from the sterile water. Besides the gram-negative water bacillus, which grows best in peptone water at room-temperature, *Staphylococcus albus*, coliform bacilli, diphtheroids, non-hæmolytic streptococci and other organisms were encountered, suggesting that spinal puncture is often carried out without regard to the ordinary rules of asepsis. The resulting contamination is irritating enough to the bacteriologist and may even lead the unwary astray, but the matter becomes much more serious when the same laxity of technique is used in the injection of spinal anæsthetics. Barrie[1] has reported 11 cases of meningitis with one death among 96 consecutive patients operated on under spinal anæsthesia in one theatre. The meningeal infection, which was seldom severe, was characterised by the abrupt onset of headache 7–10 days after operation, usually associated with drowsiness, irritability, photophobia

3. *J. ment. Sci.* 1941, 87, 608. 4. *J. Hyg., Camb.* 1941, 41, 169.

1. Barrie, H. J. *Lancet*, 1941, 1, 242.

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and neck rigidity. The cerebrospinal fluid, examined in 6 cases, showed evidence of a mild purulent meningitis. It seems pertinent to ask whether the severe headache which may follow spinal anæsthesia is not sometimes due to meninges infected in this way. In the induction of spinal anæsthesia, the anæsthetist should wear sterile gloves, the skin of the patient's back should be covered with a visible antiseptic like iodine, and the spinal needle should either be boiled and put in a dry sterile container or be previously sterilised in an autoclave or hot-air oven in an appropriate closed container. Boiled water or saline used repeatedly from a Winchester or other large bottle for rinsing or immersing sterile instruments and needles is very liable to become infected, as Bigger and Nelson [2] have shown, and this practice, all too common in hospitals, cannot be too strongly deprecated. Indeed, the need for a bacteriological control of hospital methods becomes ever more apparent.

TRAUMATIC ARTERIAL SPASM

THE local constriction of a vessel wall in response to trauma is a well-recognised phenomenon, apparent even in the injection of varicose veins. Operations on arteries are impeded by this spasm, and it has long been known that constriction of the severed ends may be sufficient to arrest hæmorrhage in severe arterial damage. Nevertheless, the importance of a local vasoconstrictor reflex in jeopardising the vitality of a limb which has been injured is not very well recognised. Last year Griffiths [3] cited traumatic arterial spasm as the cause of Volkmann's ischæmic contracture, and recently Cohen [4] has brought together clinical reports of a variety of cases illustrating effects produced by spasm of the intact vessel as a result of injury, and the type of treatment that can be applied with hope of success. He shows that simple exposure of the artery at the site of injury may be sufficient to arrest the spasm, though there is as yet no explanation of this remarkable fact. In his first case the injury was caused by a splinter of glass or of a bomb—it was not known which did the damage—passing through the arm just below the elbow-joint. The radial and ulnar pulses were absent, though they were easily palpable on the opposite side. There was a musculospiral nerve palsy. At operation six hours after admission it was found that the missile had just skirted the joint capsule, the nerve was contused but intact, and the biceps tendon was almost completely severed. The brachial artery was not pulsating, and was surrounded by a network of soft clot. For a distance of about 2 cm. proximal to the origin of the radial artery a fine blue stippling indicated bruising. A tourniquet was applied; the artery was freed from the clot and from a fine areolar tissue and pulsation returned as the tourniquet was released. The pulse after operation remained normal and the limb recovered.

Apart from penetrating wounds, other types of trauma which may be associated with arterial spasm are the application of a tourniquet (especially dangerous on the arm), fracture of a bone in the neighbourhood of a large vessel, application of plaster-of-paris to a limb, and skeletal traction to the lower leg on a Böhler's frame with the knee flexed. In this method of traction the knee forms the fixed point from which the traction acts, and the popliteal artery may be injured. Cohen gives examples of all these types of injury in which ischæmia resulted in the loss of the limb. He quotes Trueta's experience of the danger of tourniquets in the Spanish war. Towards the end of the war the Spanish surgeons used them only as very temporary expedients. Recognition of the danger of arterial spasm in fractures near large vessels should make the surgeon wary of applying closed plaster in the early stages. It is probable that, with badly contused limbs, it is better to employ the method of slinging in a Thomas splint, with special care not to compress at the flexures. Evidence of impaired circulation will then be obtained in time for the surgeon to operate with success, and plaster can be applied after the first two or three days have elapsed and the danger of ischæmia is over. If ischæmia persists the sequelæ may be: gangrene of the limb necessitating amputation; gas-gangrene infection of the devitalised and deoxygenated tissues, with danger to the patient's life; or Volkmann's ischæmic contracture of the muscles, ending in gross deformity and disability. It is not enough to relieve the cause of the trauma—to remove a plaster or tourniquet or to release traction. The surgeon must bear in mind that the spasm may continue; and if it does he must explore until he finds the spastic artery. He should examine it gently and look for evidence of damage; careful exposure and lavage with warm saline may cause it to dilate but if these measures fail he can try the effect of intravenous injection of papaverine. If there is a localised trauma, such as a hæmatoma, it may be wise to follow the practice of Leriche [5] and excise a few centimetres of the damaged vessel. Leriche was concerned to restore the collateral circulation, his theory being that the reflex, starting in the wall of the main vessel, caused vasoconstriction in the collaterals. This point is not mentioned by Cohen, but it deserves serious attention because the hope of restoring the collateral circulation is almost the only consideration which would persuade a surgeon to undertake such local arteriectomy.

Other methods, short of operation, which have been used successfully in treating ischæmia are paravertebral injections of procaine and spinal anæsthesia. For the upper limb, Cohen suggests that brachial-plexus block anæsthesia is worthy of trial. Papaverine might also be tried without exploration, though it is probably more useful when the exposed vessel remains obstinately contracted. Exploration, to have the best chance of success, must be carried out early—within six hours, in Cohen's opinion. Pain may not be serious; it seems to arise from continued ischæmia of the muscles and not directly in the spastic vessel. In most cases it is as well not to suture the wound. Closure of the damaged tissues may lead to compression, and in any case adds a little to the risk of gas gangrene.

SULPHONAMIDES AND INFANTILE PNEUMONIA

THE mortality from pneumonia in childhood has always been greatest in infancy and the experiences recorded by J. Greengard, W. B. Raycraft and W. G. Motel [6] in the children's division of Cook County Hospital, of the effect of the sulphonamides on this mortality is therefore welcome. In 1937 and 1938, before chemotherapy was used, the fatality-rates were 32% and 31%. The infants, all under 1 year, were drawn from essentially the same group and were treated by the same medical personnel and with the same therapeutic measures other than specific chemotherapy as the 1940 series which is now reported. It was originally planned to give specific chemotherapy to alternate infants but it was found after this procedure had been continued for some months that "the natural human reactions" on the part of house-physicians led to the use of the sulphonamides for the most seriously ill infants. This method was therefore discontinued after half a series of 89 infants had received sulphapyridine, and a group of 200 infants were all treated with this drug. Bacteriological control was effected in every case by taking a laryngeal swab through a Flagg direct laryngoscope. The commonest types of pneumococci were type XIV in 36 cases; type XIX in 31 cases; type VI in 25 cases; and type VII in 18 cases. As soon as a specimen of sputum had been obtained

2. Bigger, J. W. and Nelson, J. H. *J. Path. Bact.* 1941, **53**, 189; see *Lancet*, Nov. 29, 1941, p. 673.
3. Griffiths, D. L. *Brit. J. Surg.* 1940, **28**, 239.
4. Cohen, S. M. *Guy's Hosp. Rep.* 1940–41, **90**, 201.
5. Leriche, R. and Werquin, M. G. *Lancet*, 1940, **2**, 296.
6. *Amer. J. Dis. Child.* 1941, **62**, 730.

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sulphapyridine was started. In most cases the drug was given by mouth, though in a few instances when the infant was desperately ill, was vomiting, or was so badly distended that all administration by mouth had to be discontinued, the sodium salt was given intravenously. The daily dosage used was approximately gr. 1½ per lb. body-weight, divided into six doses at 4-hour intervals. As a general rule half the 24 hour dose was given as the initial dose. The drug was given as a powder suspended in water, and the average total dose was gr. 75. The drug was continued as a rule for about 48 hours after the temperature had returned to normal. For the group of 89 infants of whom half received sulphapyridine, it was found that in those treated by chemotherapy the temperature subsided more quickly, reaching normal on an average by the fourth day as compared with the seventh day among the controls. The length of hospital stay, the total duration of illness and the incidence of extension of the pneumonia were all favourably influenced in those treated with sulphapyridine, although this group included the most seriously ill infants. For the larger series of 200 treated infants the fatality-rate was 10%. Thus a reduction to less than a third of what it used to be has been achieved in infants since the introduction of sulphapyridine, and in addition the course of disease has been shortened and the incidence of spread and complications—notably empyema—greatly decreased. Reactions to the drug are less frequent among infants than among adults. Vomiting is remarkably rare considering the ease with which infants vomit, and this means that good-sized doses can be given. Other methods of treatment have naturally not been neglected. The use of oxygen and prompt measures to deal with abdominal distension (parenteral fluids, rectal tube and continuous gastric aspiration) have been employed as hitherto. Specific antipneumococcal serum has been used in some instances when indicated by typing. No exactly comparable series has been published in the British Isles but it is noteworthy that the fatality-rate from bronchopneumonia reported [7] by C. J. McSweeney of Dublin was reduced in the under-5 group from 30% in 1938 to 10% in 1939, the first sulphapyridine year—the same figure as was achieved in Chicago.

NIGHT-BLINDNESS

THE Finns are now said to be getting very short of food, and for some time the authorities there have been anxious about the shortage of sources of vitamin A and carotene. The other Scandinavian countries, and no doubt the Finns as well, are normally large consumers of dairy produce and eat few vegetables, so that they rely almost entirely on animal fats for their vitamin A. Nylund [8] made a study of night-blindness in Finland in October and November, 1940, with a view to determining whether there had been any increase in vitamin-A deficiency since the war began. He compared his findings in 31 students with those in 82 students examined two years earlier. Of the 82 seen in 1938, 79% showed normal adaptation, 9% were night-blind and 12% were borderline; in the 1940 group, only 48% had normal adaptation, 29% were night-blind and 23% borderline. He also compared his findings in 40 pregnant and nursing women (in whom the vitamin-A requirements are known to be high) with those in a similar series tested in 1938. Here again there was a falling off in dark-adaptation—from normal adaptation in 95% and night-blindness in 5% the standard had fallen by 1940 to normal adaptation in 65% and night-blindness in 25%, with 10% on the borderline. Rationing of dairy products began two months before the 1940 tests were made, the daily amounts allowed being: butter 25 g. (⅞ oz.), cream containing 10% fat 50 g. (1¾ oz.) and milk 200 g. (7 oz.). The average daily diet at that time was estimated as containing liver 3 g. (⅒ oz.), meat 150 g. (5¼ oz.), carrots and other vegetables 5 g. (⅛ oz.). On this basis the average daily intake was assessed at 1055–1280 I.U. of vitamin A, plus 455–1585 μg. of carotene. This was certainly insufficient, and Nylund urged an increased consumption of carrots, beans and spinach, with extra liver once a week. Pregnant and nursing women had been allowed larger rations, receiving daily 40 g. (1⅖ oz.) of butter, 50 g. (1¾ oz.) of cream and 600 g. (21 oz.) of milk. Their average daily diet thus contained 1870–2230 I.U. of vitamin A and 750–1960 μg. of carotene. Night-blindness did not develop on this diet and it was found that dark-adaptation was fully normal if a minimum of 2000 I.U. of the vitamin was supplied daily.

Other workers have put vitamin-A requirements higher, and it is usual now to express these in terms of body-weight. A distinction must be made also between the optimum daily intake and the minimum required to prevent dietary night-blindness in otherwise normal people. Thus for an adult man the optimum is considered by Booher [9] to be 40–60 I.U. per kg. body-weight daily, or 3000–4000 I.U. for a man of 150 lb.; the minimum protective intake for a man is 20–30 I.U. per kg. daily, or 1500–2000 I.U. More accurate work is required, however, before any definite figure can be universally accepted. The vitamin-A needs of the newborn child are thought to be covered by the vitamin-A content of colostrum and breast milk, provided the intake of the mother is adequate. The most reliable estimate of the daily requirement of pregnant and lactating women is 5000–6000 I.U.

Two retinal mechanisms are concerned in dark-adaptation. During the first 7 minutes the photopic mechanism of the cones is engaged. Subsequently the scotopic adaptation of the rods comes into play and continues slowly for several hours. More than 95% of dark-adaptation, however, is complete after 30–40 min. in darkness. Vitamin A is an essential constituent of visual purple, which is found only in the rods, but it appears also to be essential for the complete dark-adaptation of the cones. In many cases of experimentally induced night-blindness impairment of dark-adaptation begins on the first day of the vitamin-A-deficient diet and may be significant within a week. In these cases it has often been shown that vitamin-A brings about a rapid improvement, followed by a more gradual process of complete recovery, so that normal dark-adaptation may take longer to regain than to lose. It has been suggested that recovery may be hastened by adding riboflavin and ascorbic acid to the diet, in addition to a supplement of vitamin A. To obtain the most prompt and complete recovery, massive doses (100,000–300,000 I.U. daily) have been recommended by some workers; others have obtained the same result with doses as low as 10,000 I.U.

7. *Lancet*, 1940, **2**, 3.
8. Nylund, C. E. *Nord. Med.* March 1, 1941, p. 659.
9. Booher, L. E. *J. Amer. med. Ass.* 1938, **110**, 1920.

Mr. PERCY FLEMMING, consulting ophthalmic surgeon to University College Hospital, died at his home at Upper Basildon, on Dec. 19, at the age of 78.

AN editorial board has been set up under the chairmanship of the President of the Board of Education to direct the compilation of a medical history of the war. The Fighting Services, the Ministry of Health, the Department of Health for Scotland, the Medical Research Council and the War Cabinet secretariat will be represented, and Sir ARTHUR MACNALTY has been appointed editor-in-chief.

MEDICAL HONOURS.—The military cross has been awarded to Captain Leonard Bapty, M.B. Aberd., R.A.M.C., and the R.N.V.R. officers' decoration to Surgeon Commander D. C. Wilson, F.R.C.P.E.

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Special Articles

FUTURE OF MEDICAL RESEARCH

W. W. WALTHER, M.B. LOND.
DIRECTOR OF PATHOLOGY, QUEEN MARY'S HOSPITAL FOR THE EAST END

THERE is some justification for saying that we are living in the Golden Age of Medicine, for at no previous time have there been so many advances in such a short space. For example, the sulphonamide group of drugs alone have revolutionised the treatment of many common conditions. And yet there is still much room for improvement in the organisation which makes these discoveries possible. Research does not consist simply of working out and publishing the results of an original idea. Much time must be spent in reading through the literature of work already done on the subject, a task which may involve one in many strange languages, only to find, perhaps at the end of many weeks of labour, that somebody else has already worked out the same problem but has somehow failed to get immediate recognition.

In spite of the enormous volume of research which is published little of it ever finds its way into general use, partly because much of it remains unverified and partly because it is simply not noticed. This does not sound at all like a golden age, but the statement is easily supported by facts. For example, the original suggestion (based on sound observation) that the shock of burns should be treated by transfusion with a protein-containing fluid was made in the middle of last century. Yet this very practical suggestion was overlooked and only rediscovered during the last few years. Presumably nobody noticed it and it therefore failed to get verified. On the other hand, some discoveries seem so much to catch the researcher's fancy that a vast and unnecessary amount of redundant work is wasted on one particular subject. An example of this is the spate of literature which followed the first few papers about prontosil and allied drugs. It has been estimated that the number of papers published on this subject is in the region of ten thousand. Now even the most confirmed sceptic would hardly demand such a vast literature to convince him, and many of these papers are based on such a small number of cases that by themselves they would be of little significance. And yet, until an enormous amount of work on any particular subject gets published, the general practitioner does not hear about it unless it concerns some material whose advertisements are pushed under his nose. This is because the busy doctor has little time to wade through (or income to pay for) all of the large number of medical journals which are published today. But there are plenty of would-be contributors to these journals, largely owing to the fact that besides the quest for knowledge and the desire to benefit humanity there is a need to attain personal recognition. A few publications are a great recommendation for a job, with the result that, as Miller [1] says, "We find it necessary to digest an ever-increasing number of half-baked adventures in medical research." Often enough, in the haste occasioned by the desire to be first in the field, the work is scamped. Sometimes this may also be due to lack of facilities to carry out some important detail of the work. General practitioners have few facilities for accurate work or for producing a number of results sufficient to be statistically significant. In this way a large potential army of keen men is immediately robbed of its keenness. Or, if an effort is made, it lacks numerical weight. Yet under skilled guidance individual efforts can often be turned to good account. There is no dearth of subjects for research, but we lack an organisation which can apportion the work to the best advantage. Although many people no doubt prefer to choose their own subject, it is probable that under a competent authority most would be prepared to work at some set problem either singly or as members of a team.

Many believe that research is insufficiently endowed, and point out that the money available is usually only sufficient to support a newly qualified man, without domestic commitments, on a whole-time basis. Now, there is no special virtue in whole-time research work, though one may be forced to devote one's whole time to it in order to do one's own reading. Neither is it certain that the newly qualified man, however keen, is the best type for research. Admittedly, the ideas are often supplied by the head of a department while the actual work is carried out by assistants, but this does not cover and should not cover the whole field of research.

The criticism of modern research thus falls under three heads—inadequate endowment, lack of organisation, and a failure to get results embodied in practice in a reasonable space of time. It is unlikely that the private endowment of research will increase in the future, and the best way out of the difficulty seems to be the development of a part-time arrangement whereby anybody being paid by the state (and the number now is greater than ever before, and likely to be greater still) should be allowed sufficient spare time to do research if the facilities exist for it. In certain circumstances a definite prize might be offered for the solving of some particular problem. The prize of £10,000 offered by a daily newspaper encouraged research into television, with the result that, before the war, England led the world in this field, and has since led it again in radiolocation.

A CENTRAL BUREAU

For the proper organisation of research some responsible controlling body would have to be set up. This body would be equipped with an adequate library and a permanent staff whose duties would include the preparation of abstracts of all that is known on particular subjects in any language, so that the intending researcher is saved the trouble of reading a vast amount of literature in order perhaps to clear up one small point. In addition they should be capable of giving up-to-the-minute information on any medical subject to any medical practitioner who asks for it, day or night. This looks a formidable task, but, with an efficient card-index and cross-referencing system, a trained staff would soon find no difficulty in giving rapid answers to questions. The cost of maintaining such a library would be great, but it would be well worth it. H. G. Wells, in his "Shape of Things to Come" had such a scheme for the card-indexing of all knowledge—the "Memory of Mankind," with headquarters in Barcelona. All research work, both current and projected, would have to be registered with the bureau, which would then be able to prevent anyone from engaging on redundant work. It could also apportion the work to the best advantage, and organise the appropriate team for the rapid solution of special problems and for the verification of important observations in the shortest possible time. Another important function would be the organisation of teams of general practitioners, with the use of laboratory facilities, to carry out research on minor ailments which do not usually find their way to hospital beds. All this could only be done by an official body with wide powers which enjoyed the confidence of the whole medical profession. Such a body should, of course, be organised internationally, like the International Labour Office at Geneva, but as the post-war future is impossible to foresee a start should be made here. The tendencies of foreign research should be watched and all allied and friendly neutral countries asked to participate in an exchange of medical knowledge.

The results obtained would be examined for contradictions which could be dealt with immediately by repetition; they would then be submitted to statistical analysis and finally written up in collaboration with an editorial staff whose job it would be to compress the material into as small a space as would be consistent with clarity. An accurate abstract would be prepared at the same time. Important results might well be published in full in a separate international journal of research simultaneously produced in those countries which participated, and the abstracts would appear in the regular journals.

The rapid dissemination of results important to practitioners would be the last and most important duty of the bureau. As has already been pointed out, owing to the multiplicity of journals, results may never reach the people who would most benefit by them. To correct this results embodying new methods might be circularised to practitioners in the form of a loose-leaf supplement to a standard textbook, the production of which would be one of the first jobs of the editorial and library com-

1. Miller, N. F. *J. Amer. med. Ass.* 1941, **117**, 905.

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mittee. We might then at last get a textbook which was readable, and it could be kept constantly up to date by replacing obsolete information with new leaves. This textbook—or rather the series of them to cover all the special subjects—should be sent free to all members of the medical profession including students, and the supplements would also be free. Though this would be an added burden on the public purse it would be in a good cause. An organisation for disseminating information on the latest methods of treating air-raid casualties already exists. The E.M.S. sends round circulars on official methods of treatment and is even collecting information on some subjects. An extension of this principle to the whole of medical practice could hardly be thought objectionable.

* * *

Let us then demand facilities for the proper organisation of research, for assuring the research worker a reasonable living, for leading him to the problems which most urgently require solution, for preventing him from engaging on redundant work, for providing him with an adequate résumé of all that is known about his chosen subject, and, most important of all, for getting the knowledge as quickly as possible to those whose job it is to use it. We need an organisation which, as H. G. Wells puts it, "accumulates, sorts, keeps in order and renders available everything that is known."

PALESTINE

MORTALITY AND SICKNESS AMONG INFANTS

THE infant mortality in the past ten years has been analysed in the July issue of *Hadassah*, the bulletin of the Jerusalem University Hospital. The deaths have been grouped according to the various races found in Palestine, and it is encouraging to find that the rate has fallen in all sections of the community. Thus over the period 1931–40 the rate has fallen from 186 per 1000 to 147 among Arabs, from 133 to 107 among Christians, and from 81 to 59 among Jews. The infant death-rate is highest between April and September, the Palestinian summer months. Among Arab infants the summer rate is double that in winter, and among Jews half as much again as the winter rate. The commonest recorded causes of death are congenital debility, diarrhœa and enteritis, and bronchopneumonia. Bograchow, of the children's department at Tel Aviv, in an account of his experience with infantile diarrhœa during 1938–40, says that on the whole the disease affects older infants in Palestine than it does in Europe because almost all Jewish mothers breast-feed their infants, who are thus safeguarded against infection carried by cow's or goat's milk. Nevertheless the social status of the family and the nutrition of the infant are important in ætiology and prognosis. Thus infantile diarrhœa is very common among the poorer Jewish families. Nutritional disorders are also common, and often associated with qualitative or quantitative hunger. He mentions a toxic form of infantile dysentery with a fatality of 100%.

POISONOUS BITES AND STINGS

J. Seide of Jerusalem, writing in *Harefuah*, reviews the poisonous fauna of Palestine. These include the jelly fish, *Rhizostoma pulmo* and *Aurelio aurita*, and the sea anemone, stings from which give rise to toxic skin eruptions. The bite of the centipede *Scolopendra cingulata* causes pain and swelling but is otherwise harmless. Spiders of the genus *latrodectus* are highly poisonous and a sting from one may endanger life in a child. *Tarantula albofasciata* is less poisonous. There are six different species of scorpion in Palestine, all of them poisonous. The commonest is the yellow *Buthus quinquestriatus*, which gives an extremely painful sting causing local inflammation and sometimes constitutional disturbance, though Seide had never seen a death from such a sting. Bees, wasps and hornets sting like their kin elsewhere, and bites from ants are negligible. Several species of poisonous fish cause trouble to fishermen, including species of scorpæna and trachinus. The venomous snakes found are mostly vipers, the oriental form of the Levant viper being the most common in inhabited parts of the country; its bite may cause death, and prognosis depends chiefly on the promptness with which antitoxin can be given. Of 23 cases treated in hospital 3 were fatal. Bites from *Vipera lebetina* are discussed more fully by Lefkovitz in a separate paper. These are becoming commonest during the hotter months. The victim develops local and general signs, among which circulatory disturbances are prominent; indeed vasomotor instability often persists for years after the bite. At the time of the injury œdema and hæmorrhages are common. Experiments on frogs suggest that the toxin attacks the vascular endothelium, causing progressive engorgement of the peripheral vessels; the condition spreads from the region of the bite. The patient develops hypotension, low temperature and myocardial failure with collapse, and may die from circulatory failure. Treatment at present recommended is ligation of the affected limb and injection of serum.

PRECAUTIONS AGAINST MALARIA

Malaria is increasing in some of the northern districts. The health department of the Jewish agency and the university appointed a committee of inquiry under the chairmanship of Professor Mar, which reported some months ago (*Hadassah*, March, 1941). The committee advised that the tents and huts of the colonists should be provided with mosquito-nets, and that specially constructed doors should be supplied to the huts. These recommendations are being carried out and the colonists are being instructed in keeping their irrigation canals clean and free from plants so as to discourage the breeding of the larvæ.

MILK FOR INVALIDS

UNDER the Ministry of Food's milk-supply scheme priority-supplies of liquid milk are allowed to certain invalids against a certificate given by a medical practitioner. The conditions qualifying for these special supplies are now specified in a list, drawn up by the ministry's medical advisers and made public on Dec. 11, as follows:

Active tuberculosis of all types;
Silicosis;
Affection of the mouth, throat or gullet or organic nervous disorder causing interference with swallowing;
Gastric, duodenal or anastomotic ulcer;
Illness characterised by high and prolonged fever;
Post-operative conditions after major operations;
Active workers, including domestic workers, during an illness which temporarily incapacitates them for work;
Sick children not attending school;
Dyspepsia due to conditions other than ulceration of the stomach or duodenum;
Colitis; Diabetes mellitus;
Thyrotoxicosis; Nephritis;
Hyperemesis gravidarum; chorea of pregnancy; acute yellow atrophy occurring during pregnancy; albuminuria of pregnancy; eclampsia; which are of sufficient severity to entail total confinement to bed.

These diseases and illnesses are the only conditions for which special supplies of milk to invalids may be authorised by a medical practitioner. The quantity of milk allowed is at the discretion of the doctor, subject to a scale prescribed by the Ministry of Food.

FOUR observations in Dr. A. T. W. Powell's school report for WALTHAMSTOW call for comment: decline in corneal ulcer; decline in organic heart disease; decline in chronic otitis media; and increase in dental caries. These changes are common throughout the country. In 22,847 inspections and reinspections only one case of corneal ulcer was detected, yet formerly this disease was often found in school-children. It increased in incidence in the last war, but since then it has decreased almost to vanishing point, probably because of improved nutrition. The decline in chronic otitis is mostly due to greater attention to the treatment of the acute phase of the disease, but also in part to the lowered severity of scarlet fever and measles. The decline in heart disease and child rheumatism, which is noticed in all units with rheumatism clinics, is none the less welcome because its causes are obscure. The increase in dental caries, especially in infants, may be due to greater attention, but most dentists believe it to be genuine.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE little I know about Japanese mental processes, so different from ours, inclines me to believe that their communiques will be even less reliable as a source of news, but more indicative as to intentions, than the German ones. The Hun mind starts off with the raw material, truth; halves it, doubles it, twists it, or suppresses it according to need, but at any rate starts with it as a basis, a relic of a code of morals that bound and helped to evolve the European world. The Jap uses truth like steam, to be harnessed to man's use, if required; to be replaced by pure invention, like some of those landings, if a trap demands. My mind goes back to a time when I nosed about on the outskirts of their ports, Nagasaki, Yokohama, Kobe; got the same feeling as I do with dogs and birds at home—that here are minds working in different ways to mine—and played at putting myself in their place. I remember the points where I seemed to come in contact with them: the "soil sense" and my sympathy with the jinrikisha man who hoarded his daily urine in a tin to bring back to his little terraced garden; their sense of beauty, the single flower with a background, which seemed to me to be a reflection of the stamped beauty of the inland sea; the infinite patience and delight of the growers of dwarfed trees; the public hot baths and their sensual skin pleasure of cleanliness; the small boat men, their love of the sea and the tides, and their fear of it. Those seemed to be the tiny points of contact; far away I sensed a religious nationalism which was as foreign to me as our moral system with its emphasis on sex is to them. There is a certain satanic humour in the facts that in this war with Japan—a real war between sub-species—she should be allied to those who make a fairy story of race purity and world domination, and fighting against those whose industrialism has been at the same time the source of her strength and her poison.

* * *

As a relief from the world war Mr. A. P. Herbert's word warriors will find a happy hunting ground in the recent B.M.A. report on Industrial Health in Factories. A few points can even be scored off the title itself because health, unlike peace, is apparently divisible, the implication being that in addition to "industrial" health, other types of health are to be found in factories. The word "industrial" keeps cropping up like King Charles's head. Thus "an industrial medical officer is appointed to a factory"; it is not possible to appoint a doctor to a factory, he must be an "industrial medical officer" even before he has had any experience of factory life. Again, a new specialty called "traumatology" is to be fostered and attention is called to the scarcity of trained "traumatologists" in the country. It appears that the ordinary doctor has had no training in treating injuries. In due course we shall undoubtedly get subdivisions of the new specialty, such as cephalotraumatologists, thoracotraumatologists and even digitotraumatologists. One can already visualise the necessity for a new society to be called the Association of Philotraumatologists. Then there is a crying need for doctors constantly to attend postgraduate lectures (for after all there is nothing like a continual state of postgraduateness for keeping doctors out of mischief) so that they may understand more fully the fact—as yet imperfectly recognised—that when somebody is whacked with a rubber truncheon a solution of continuity might arise anywhere in that body's body, depending on the part whacked and the nature of the earth's crust on to which the whackee might fall. No-one but a skilled traumatologist of some years' experience in Birmingham would be entitled to repair the breach. A mobile air-borne team of traumatologists should be kept champing on the air-screw so that they might dash off to Land's End or John o' Groats at the slightest provocation, and particular care must obviously be taken to include in the team relays of digitotraumatologists because cut fingers are so common, don't you know! Wounds will no longer be sewn up with surgical needles and catgut or silk, but with traumatological aiguilles and tautological byssofils.

* * *

I'm imprisoned hopelessly, deep down in a dungeon; how did the old saw go? "Down in a deep dark ditch lay an old cow. . . " No, that doesn't seem to fit, but anyway it's deep and it's dark, and there seems to be no escape; my tongue is swollen, I can't even whisper, let alone shout for help. How can I get at that man who keeps yelling in my ear, "Come on, Sir, come on"? Suddenly the shouting swells to a terrific volume of sound very close to my ear. I seem to be climbing through the roof, but the prison suddenly resolves into the reality that my blankets have got twisted round me, I'm thirsty, and the camp bed is too small for an expansive sort of nightmare. "Oh, all right George, I can hear you now; yes, I'll get up; yes, thank you George, I know the tea's cold; I never hear when you call me first . . . what's that, only five more minutes? O.K., George, I'm up now, you needn't worry any more."

My batman and I have, between us, accomplished our most difficult job in the day—getting me out of bed. I always intend to have half an hour at least for washing and dressing, but as often as not it ends by being concertina-ed into five minutes. With the mists of sleep still clinging to my eyes I stumble into breakfast; usually a solitary meal (the M.O. always has to get up before anybody else), but this morning I find another man, the new M.O. replete with breakfast, impatient to be off. "Well, Durrant, I see you've taken to heart the tip I gave you last night about getting up early enough to eat a decent breakfast." "Don't worry, there's still some food left." I switch on the wireless, explaining that as soon as the announcer has mentioned how many raiders were over England during the night it is time for me to get going. I can tell from the look on Durrant's face that I am wasting my breath, and that he will always be on his way long before the announcer gets near the microphone. But I persist manfully in giving him all the petty details of the daily task, helping him metaphorically over many stiles that seemed difficult to me at first because, as I tell him, I was the first doctor appointed to do regular rounds of this chain of forts.

Crossing the parade ground we glance back at the windows, now beginning to fill as the shavers thrust their white-lathered faces out for that first breath of morning air, and I tell Durrant about a photograph that I look forward to procuring from the Nazis when we've beaten them. Three mornings in succession, at the same time, they came over and snapped me just as I was crossing the parade ground. I should like to know what I look like from 30,000 feet. Barely controlling his self-righteousness at noting that the sun is not yet above the housetops, Durrant is a little abashed when I point out that nearly all the essential services of life have already finished their morning round: the postman has been, the baker has gone, we had fresh milk with our breakfast, the newspapers only just miss us. "And anyway," I remind him, "this is nothing to the winter; why it's pitch-dark then when you set out to catch the boat."

Every morning (although I never have time to stop to do it) I almost catch my breath as I burst through the mouth of a little alley, on to a pathway in full sight of the sea. The path trots down some steps and joins a road to curve round a tiny bay, leading us along to a small pier where the boat waits each morning. It takes five minutes to walk round that little bay, never dull ones; there has always been the excitement of trying to get to the boat in time, as well as the exciting beauty of that inlet, with the harbour on the far side of the breakwater an ever-changing pool of ships and far away the open sea. There have been still, frozen winter mornings when the "bowl of night" has lingered mirrored in the waters; mornings when the sun has only winked a solemn eye above the horizon's edge, disliked the prospect, and sought slumber again under black blankets of cloud; mornings when the sun has pointed a fiery finger across the flat grey sea, touching one with warmth and beckoning the soul to infinite distance. ("Be careful down these steps, they're very slippery in winter . . .") Mornings when there was rain, biting in winter, flooding in spring, splashing in summer, or just a film of damp, uncomfortable mist. ("Buy an oilskin; it doesn't look very military, and it won't get you a salute from an A.B., but it's worth more than you pay for it. No, I'm afraid mine isn't for sale.") Days when the clouds are soft creamy pillars of down, jagged snow-capped peaks on grey mountains, or growling, muttering, crackling blackness shooting tongues of livid fire across the sky. ("No,

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I don't know, officially, what they make in that building, but they always start up that motor with its funny little phut-phut-phut exhaust just as I come round this corner. . . . Yes, Jerry did have a crack at it one day, but he hit the sea and bent those rocks a bit. They usually hit the sea round these parts.")

Now for the final straight, the skipper has sighted us and is starting up the engine as a hint that we should make some show of running because, of course, I am just a minute late—it always ends that way. At first the skipper didn't take to me at all kindly, said he was dashed if he'd wait for me or any other dashed doctor. But somehow he always does wait. ("Look at those pink flowers, I don't know what they're called, but you'll find an amazing variety of flowers leading a fairly comfortable existence among the crevices of the rocks, even down to the water's edge. I can't imagine how they do it, because this breakwater is fiendish in all winter weather, often in spring, sometimes in summer, and it can be deadly in autumn. Only a week ago it was so rough that not a single boat could put off—the wind whistles through the telegraph wires, flings the sea across the breakwater, roars into one's eardrums, freezing them to agonising deafness, and threatens all the time to dash one on to the rocks below.")

"Good morning, skipper." "Mornin' Sir, let 'er go, Dick." We take shelter in the wheel house. "What's this I hear about a new doctor, Sir? terrible it is; why we only just get to know one when they sends us another. But there, perhaps he'll get up betimes in the morning, then I shan't be so behindhand with my work all day." It is a pity that the skipper will no longer be able to start his working day with this masterly exaggeration.

To any Englishman this twenty-minute journey across the enormous harbour would be fascinating; to a man used to reaching his daily work by bus, tram or tube it is a holiday. Today, it is true, the harbour is almost empty, but one day the traveller will see H.M.S. ...., well he will see various units of the Royal Navy, he will see merchantmen of all shapes and sizes and nationalities, trawlers and drifters, seaplanes, prizes that once flew the swastika or were built in Genoa or Naples, and he will notice many other things that are best left unwritten. ("No, I've never disgraced myself on this boat, though there are occasions when it is hard work for two men to swing the wheel and hold it, especially outside the boom in one of these sou'westers that blow up so suddenly hereabouts. And I could tell you a story about the sergeant-major of the Battery that we are about to visit, but perhaps it would be fairer to let you wait for that one until, in a sudden confidence, he tells you the sorry tale himself.") The fort, from being a rounded blob in the early-morning haze, now begins to take shape and to stand out black and defiant against the horizon. Seagulls wheel and circle, alight and take wing in a continuous poem of movement; their skirling pierces the sea-born silence. "Well, here we are; good-bye, skipper, I shan't be seeing you again, because we'll return in the *Ladybird*." "Mornin', Sir, best of luck to you."

The party waiting to go ashore for day leave always present something of a problem. It is not easy to make a correct and dignified return to their grinning salutes when one is concentrating on a perilous scramble up a slippery ladder. And now for our second breakfast. "Hello, doc, are you back again already? Oh, well, it's your last day, thank heavens, so I suppose we must be grateful for small mercies!" I wonder how long it will be before they have such a cheerful greeting for my successor, now being treated with meticulous politeness. A matter of a few days only, I expect; the traditional reserve of the Englishman is soon dissolved in these friendly surroundings. As we leave the main door of the fort after our cups of tea I automatically clutch at my cap. There is always a breeze lurking round the corner waiting to toss one's headgear to the waiting waves. After it had twice caught me out, and I had proved that the cap, S.D., does not stand up to immersion in seawater, I resolved it would never happen again, or if it did that at least it would not cost me so dear. I have learned to appreciate the troops' "fore-and-aft."

* * *

Great work has been done by the Ministry of Health in the provision of amenities at rest centres where homeless people may be drafted after a severe raiding incident. Arrangements are made for the primary comforts of shelter, a cup of hot tea, blankets to encourage sleep, food for the hungry, and medical and nursing care for the sick. Loyal workers of all kinds have been earmarked—W.V.S., school nurses, health visitors, district nurses, Civil Nursing Reserve, public-assistance officers, public-health medical officers, and so on. The storage cupboards at the centres are a feast for rationed eyes, with their shelves of tinned and bottled goodies that have long since departed from the shop window. One thinks of the dark cloud and its silver lining and turns sadly away with the sublinguals working at top pressure. Going round some of the centres recently it struck me how much was being attended to in the material sense, how little in the spiritual. If, I thought, we are compounded of body and soul, where does the soul side come in during the drab hours? Of course there are the encouraging word, the cheery smile, the friendly pat on the shoulder. But these things are individual and do not necessarily affect the mass; and the morale of the mass is on all counts very important. In addition to all the voluntary helpers the ministry should see that a gleeful soul with a piano-accordion is on the centre staff—one who can play "Roll Out the Barrel" and sing "Begone, Dull Care." As musician he might be, more than any other, entitled to wear the mystic letters "A.R.P."

Parliament

QUESTION TIME

Students and National Service

Mr. E. BEVIN, minister of labour and national service, informed Sir ERNEST GRAHAM-LITTLE that the lowering of the age of call-up to include men born in 1923 would not affect the arrangements made for students following specified scientific or technical courses. Other male students at the universities who were in the 1923 age-class might apply to the university joint recruiting boards and if they received a favourable recommendation they might after enlistment into one of the fighting services be placed to the reserve and, subject to the exigencies of the service, complete one year at the university while receiving training in the senior training corps or the air training squadron. These arrangements would not extend to students who had already completed three terms at the university. At present it was not intended to call up women under the age of 20. The arrangements for women students over 20 were being considered.

Central Medical War Committee

In answer to a question Mr. E. BROWN, the minister of health, stated that the services committee, which the Central Medical War Committee has authorised to deal with questions affecting the recruitment of individual medical practitioners to H.M. Forces and other cognate matters, has met 17 times in the 12 months ended Nov. 30 last. The attendances were as follows:

Members	Attendances Actual	Possible
*Sir Alfred Webb-Johnson	9	12
Sir Girling Ball	15	17
Dr. J. A. Brown	11	12
Dr. A. E. Clark-Kennedy	—	5
Dr. H. Guy Dain	—	5
Dr. R. O. Eades	11	12
Sir Francis Fremantle	15	17
Dr. F. Gray	12	12
Dr. D. G. Greenfield	6	17
Dr. E. A. Gregg	11	17
Dr. G. Lilico	16	17
Dr. Peter Macdonald	15	17
Dr. J. C. Matthews	13	13
Dr. C. Newman	8	12
Prof. R. M. F. Picken	12	17
Col. A. H. Proctor	12	17
Prof. W. Fletcher Shaw	—	5
Mr. H. S. Souttar	12	17
Sir Charles Wilson	2	5
Dr. S. A. Winstanley	7	12

* Chairman until succeeded by Sir Girling Ball.

Observers	Attendance Actual	Possible
Admiralty	10	17
War Office	10	17
Air Ministry	9	17
Ministry of Health	17	17
Ministry of Pensions	10	10

Industrial Health Research Board

Replying to Mr. F. MESSER, Sir JOHN ANDERSON, the lord president of the council, said: The Secretary of the Industrial Health Research Board is Sir David Munro, who is sixty-three years of age. He is at present giving part of his time to the Ministry of Supply as chief medical adviser, but in view of that a senior member of the board's investigating staff

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is acting as joint secretary. There are thirteen full-time investigators (none medically qualified) whose names and qualifications are as follows: T. Bedford, D.SC., E. G. Chambers, M.A., F. A. Chrenko, W. M. Dawson, B.SC., E. Farmer, M.A., Miss Alice Heim, PH.D., D. E. R. Hughes, B.SC., R. Marriott, B.SC., Miss May Smith, D.SC., F. G. L. Stock, C. G. Warner, PH.D., H. C. Weston, M.I.I.E., and S. Wyatt, D.SC.

Mr. MESSER: Does the Minister not think that this important post ought to be a full-time job, especially as it was so during the last war?—Sir J. ANDERSON: Normally it is a full-time job, but Sir David Munro is giving much needed help in the ministry of supply, and so far as his time is not available to the board, the gap is filled by the temporary appointment of a senior member of the staff.—Mr. MESSER: Is the Minister aware of the grave dismay with which the public have received the report of the British Medical Association that not less than 32,000,000 weeks are lost each year by industrial workers through preventable illness?—Sir J. ANDERSON: The business of the board is not primarily concerned with industrial disease, but with such matters as industrial fatigue, and the like.

Medical Practitioners as Combatants

Sir ERNEST GRAHAM-LITTLE asked the Minister of Labour how many registered medical practitioners were at present serving as combatants in any of the fighting services; and whether, in view of the shortage of medical personnel for both civilian and military needs, he would allocate such practitioners to medical duties.—Mr. BROWN replied: Arrangements have been made to secure that normally a registered medical practitioner may serve in H.M. Forces in a medical capacity only and although I cannot give a precise figure I have reason to believe that the number serving as combatants is negligible. The matter referred to in the last part of the question appears to be for the Service ministers who agree that it is only in exceptional circumstances that a medical practitioner may be employed in a non-medical capacity.

Soldiers in Medical Category C

Captain H. D. R. MARGESSON, secretary of state for war, replying to Mr. F. J. BELLENGER said that many soldiers of medical category C were at present performing useful service in the Army by freeing men of higher categories for more active duties, and in view of the present man-power situation he could not agree to their automatic discharge. Where application was made for the release of an individual for work of national importance the soldier's medical category was taken into account.

Hospital Staffs

Major G. OWEN asked the Minister of Labour whether, in view of the shortage of nurses and domestic staffs in hospital, he is prepared to recognise such service as a form of national service.—Mr. G. TOMLINSON replied: I recognise service on the nursing and domestic staffs of hospitals as one of the most important forms of national service. It is included in the short list of vital war work for women for which women registered under the Registration for Employment Order are required.—Major OWEN: Is Mr. Tomlinson aware that many hospitals are short of domestic staff? Is it not a corollary of this order that the Minister will now be able to direct women with experience of domestic service to these hospitals, as he is able to do into the Armed Forces?—Mr. TOMLINSON: I should require notice of that question.—Sir JOSEPH LAMB: Is Mr. Tomlinson aware that the women who are being sent now are daily workers, who arrive at 8 o'clock and leave at 5; consequently there is no one to take charge of the early or late work?—Mr. TOMLINSON: Hospitals, like all other institutions and industrial organisations, are having to do the best they can with the material available.—Sir J. LAMB: With the best will in the world, how can they wait till 8 o'clock to give all the patients their breakfast?—Major OWEN: Is Mr. Tomlinson aware that there are institutions of this character which have no cook at all? The matron of one hospital, to my own knowledge, on Sunday last had not only to look after the dressing of the patients, but to cook dinners for 14 people.—Mr. MESSER: Before the department considers compelling anyone to work at a hospital, will Mr. Tomlinson do his best to see that the remuneration of the lower-paid staff is improved?—Mr. TOMLINSON: I will consider all the suggestions that have been made.

Detained Persons and Insurance Benefits

Miss F. HORSBRUGH informed Mr. DAVID ADAMS that regulations would shortly be made under powers conferred by section 8 of the National Health Insurance Act 1941 by which persons detained under Regulation 18B who before detention were entitled to N.H.I. benefits would be given an opportunity to safeguard their health insurance and contributory pension rights by paying within a reasonable period after their release contributions at a reduced rate for the period of their detention. The reduced rate of contribution payable in these circumstances made due allowance for the fact that such persons were not in a position to obtain health-insurance benefits during their detention. Replying to a further question, Miss HORSBRUGH said that there would be a lapse of time after these people were released before they fell into arrear in respect of contributions.

Letters to the Editor

PSYCHIATRISTS AND THE RECRUIT

SIR,—I have been much impressed recently by the number of patients one sees who are invalided out of the Forces on account of mental illness. This is obviously uneconomic and wasteful in two respects. These men and women have to be equipped and trained and presumably cost the country a considerable amount of money for short and unsatisfactory terms of service, as well as taking up hospital time and accommodation before discharge. In addition many of them are people who, while they have a precarious adjustment to life, have done and could do useful work in civilian life, if their mental equilibrium were not disturbed by the need to adjust to unfamiliar and distasteful conditions, to say nothing of combatant service. We are told that these conditions are caused by an insufficient number of psychiatrists to advise recruiting boards, and to treat early and slight anxiety cases in the Forces. Much of the time available for treatment must necessarily be taken up in diagnosis and disposal of so much unsuitable material. Is it not time that the available psychiatric personnel of the country were more thoroughly mobilised? There are still many qualified and experienced women psychiatrists upon whose services no national call has been made, and the institutions for the chronic mentally sick boast many highly qualified and experienced psychiatrists whose work hardly, in this national emergency, makes the demand upon them which they would probably welcome.

Harley Street, W.1. MARION GREAVES.

FRACTURED FEMORAL NECK

SIR,—The outlook expressed by Mr. Cochrane on the plaster treatment of fractures of the neck of the femur must seem to some surgeons retrogressive. Surely the greatest gain that pin fixation of these fractures has brought is the diminution of the mortality-rate due to hypostatic pneumonia. A patient whose fractured femoral neck has been pinned can straightway sit up and do breathing exercises, and in a few weeks he can be up and out on crutches—instead of spending three months in bed between sandbags or splints, or having his chest and abdominal muscles badly hampered by a Whitman type of plaster spica.

Mr. Cochrane's note that in spite of considerable experience of these fractures he has not had a case of aseptic avascular necrosis needs some further explanation. He states that many of his cases became arthritic, and one would have thought that if the X rays of some of his arthritic cases had been examined at the critical period of 6–8 weeks after the fracture they would have shown death of the head. Failure to spot avascular necrosis at this stage, as pointed out by Watson Jones here and by Phemister in Chicago, usually results in an arthritis. They considered that unless the head of the femur is protected, during this stage of revascularisation, from the traumata of movement or the compression of weight-bearing, distortion and exfoliation of cartilage leading to arthritis must result. As Watson Jones points out in his book, fixation by pinning secures apposition with firm fixation of the fracture line and this, coupled with an absence of weight-bearing, is essential if the head is to be revascularised. May not the torsional strain, which must fall on the fracture callus when Mr. Cochrane allows early movement of the knee out of his plaster spicas, be responsible for some unrecognised cases of avascular necrosis? And these cases, though union by bone is possible, usually end up as arthritics unless they are carefully treated.

National Temperance Hospital, N.W.1. G. O. TIPPETT.

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HOSPITAL DESIGN

SIR,—The modern hospital is a complex instrument and it must be designed by those who are to work within its walls. The R.S.M. discussion (*Lancet*, Dec. 13, p. 737) was timely. It is impossible for an architect to design a hospital alone; he must have the coöperation of the medical staff. This entails a great deal of thought on the part of the medical men concerned, and coöperation and patience on the part of the architect. In one hospital, for whose design I in conjunction with my medical colleagues was to some small degree responsible, sixteen plans were prepared before the final one was chosen. Other hospitals where this coöperation was lacking and which have left design to architects are saddled with unsatisfactory buildings. Many instances of this could be given, but I will cite two. In a medical school which has recently been rebuilt, the lecture theatre cannot be heated in winter. The heating is by warm air blown into the room and when it is turned on is so noisy that the lecturer cannot be heard. The seats are built at such an angle that in order to be heard by the audience at the back he has to have his head permanently hyperextended. Similarly in a newly erected private block there is no sound insulation between the patients' rooms or between the floors.

I would therefore urge strongly that the staff of any hospital that contemplates rebuilding should get together a year or so beforehand and make up their minds what they want, and where they want it, down to the minutest details, and not to place reliance upon an architect who manifestly is unable to design such a technical instrument as the hospital has become.

Harley Street, W.1. DAVID LEVI.

A NEW METHOD OF TREATING STAMMER

SIR,—The view that stammering is a symptom whose origin must be sought in the psychological field has been reached independently by medical psychologists and speech therapists. Study of its character and development shows that different types of stammering represent different stages of the same disorder. In the development of a stammer, the sequence of stages is the opposite of that found in normal development and evolution of speech; we are therefore justified in thinking of stammering in terms of Hughlings Jackson's theory of dissolution in the nervous system—the reversion (or regression) in disease to progressively more primitive types of function. The first stage of stammering is now generally regarded as due to a dissociation between thought and utterance. This disharmony leads to the reiteration of syllables, words or phrases (clonic stammer), a primitive type of utterance comparable to the prelinguistic babbling in the child's speech development. The forces which bring about a dissociation between thought and speech are usually but not necessarily emotional; at the onset they are unconscious to the mind of the speaker, and may remain so for some time. Unfortunately repetitive speech is stigmatised by those around the stammerer as "bad," "slovenly" or "childish"; he acquires the same misconception, endeavours to improve his speech and is exhorted to do so. But since the nature of his disorder is unrecognised, the steps he takes in order to stop the reiterations are erroneous and lead him into the second stage of stammering, characterised chiefly by hypertense articulation (tonic stammer). This hypertonicity represents those primordial hypertense postures which symbolise aggressive emotions. Once more the stammerer can see no way out. This blind-alley situation recurs at intervals, entailing a number of characteristic stages, and ultimately leads to complete discouragement and resignation.

Medical psychologists deal with a stammer in accordance with their views on the nature of the neuroses; speech therapists chiefly use relaxation, suggestion, persuasion, diversion or even philosophical methods (for example, the stoic doctrine). All these methods overlook the fact that stammering develops in stages. If a given stammerer's symptoms symbolise landmarks in his efforts to grope his way along the blind alley, treatment should permit and encourage him to go back in his manner of speech to the point where he diverged from the right track. This point is marked by reiterative (clonic) utterance. Unfortunately, to the stammerer and those in contact with him to speak in this babbling way means to stammer worse. Actually such speech is nearer to normal speech than any mode of speaking which he may have acquired on his way through the blind alley. The lack of hypertonicity in such reiterated utterances suggests to the patient the truth of this fact and he readily admits it; nevertheless the therapist's endeavours to induce him to retrace his steps to the clonic stage may meet with considerable resistance; the patient feels that the ostensibly babyish reiterated speech must increase his social difficulties. However, in suggesting the reversion, the therapist sanctions that infantile speech which has long been repressed, and thus acts as a symbol of the parent figures of the patient's infancy—a procedure sometimes leading to difficulties which cannot be dealt with here.

The method outlined has given promising results in a series of cases, and I draw attention to it at this stage because it may prove useful in treating cases precipitated by war stress.

Tavistock Clinic. LEOPOLD STEIN.

VOLPAR PRODUCTS

SIR,—In a recent paper (*Human Fertility* February, 1941, p. 1) Dr. R. L. Brown and Dr. C. J. Gamble describe their technique for testing the in-vitro efficiency of commercial spermicidal products. Their findings place Volpar at the head of a list of a number of such products, thus confirming the findings of Dr. J. R. Baker. This preparation was devised as a result of nearly ten years research by Dr. Baker and Dr. H. M. Carleton (whose joint book was reviewed in the *Lancet* 1936, **1**, 1071) and was only then put on the market. Dr. Brown and Dr. Gamble raise two important points: that contraceptive efficiency measured by laboratory methods does not necessarily tally with clinical experience; and that volpar contains a mercurial compound which has not yet been shown to be harmless when used regularly over a long period. The first point can only be settled by reports on clinical results, preferably recorded in a uniform and comparable way. The Family Planning Association had hoped to publish such evidence but the war has interfered with the collection of records; information is, however, slowly accumulating and will be published in due course. And with regard to the second point, no evidence of cumulative toxic action has been anywhere recorded. I have myself had under observation for periods ranging from 1 month to 4½ years more than 500 patients regularly using volpar products, and in no case has there been any sign of mercurial poisoning.

MARGARET HADLEY JACKSON,
Member of the Medical Subcommittee of the Family Planning Association.

Crediton, Devon.

CORONER'S COMMENT.—The quotation in Dr. Carling's letter (*Lancet*, Dec. 13, p. 748) should read "... your duty to comment on the *number* of the staff at the hospital."

Obituary

"WELSH OF FELTON"

Dr. Robert Anthony Welsh succeeded to the practice of Dr. Edward Anthony Hedley of Felton, Northumberland, married Hedley's daughter, and lived for 47 years in a Jacobean house known as "Peth Foot" which had been the home of a line of country doctors, father to son, for four generations. His life was, as he said himself, largely occupied in going to and fro; on some days he might travel 40 miles, seeing only four or five patients, and after he gave up his horses for a steam car and then a petrol car of French make he might still have to improvise a stretcher to carry an emergency case a mile or more over heathery moor. Difficult midwifery must be done single-handed and fractures were treated at home. Next to the motor-car the installation of the telephone brought the greatest change into his life. It is an old and inspiring story which he was induced while still in practice to tell in these columns under the heading "The Doctor's Day"—in the depths of the country. It was the life of his choice and if he had had his time over again he would still have been a country doctor. Welsh was born in 1864 and qualified at Newcastle in 1891; when he retired three years ago it was only to move nearer to Newcastle, where he died on Nov. 21. And his son, Dr. Edward Anthony Welsh, carries on the practice.

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MEDICINE AND THE LAW

A Soldier dies of "Not Culpable Negligence"

UNDERSTAFFED as they may be, and preoccupied with the task of administering medical services without properly trained personnel, the military authorities will doubtless pay attention to the remarks of the coroner who recently investigated the death of a soldier at Llangollen. Our readers can form their own conclusions from the story and can decide the steps they would take to prevent the possibility of a similar occurrence.

Gunner Bird, R.A., aged 23, was the cook at a regimental medical post. Having a cold, he asked the V.A.D. nurse at the post for some medicine. She gave him a cough mixture. At about 10 P.M. on the next night (a Saturday) he went to the dispensary again for something for his cold; he asked for something different from the medicine of the previous night, because the cough mixture had done him no good. She gave him a dose of phenol, a teaspoonful in half a cup of water. He said it tasted strong; she gave him a cup of hot water. He said he was going to be sick. He went to the sink; he was not sick but said he had "needles and pins all over." The nurse shouted for another nurse stationed at the post, and the corporal in charge (who is responsible in the absence of the medical officer) was fetched. The corporal telephoned for the doctor and gave Bird a solution of salt and water. Having learnt what had happened, and given hurried instructions, the doctor went to his surgery to collect his bag and stomach-tube. While he was there, a second telephone message came; Bird's condition was worse and the nurses could get nothing down his throat. The doctor dashed to the post by car and found Bird in a comatose state; his symptoms were consistent with carbolic-acid poisoning. The stomach-tube was tried and the doctor did what he could, but the patient soon afterwards died. The medical officer in charge of the post, a major of the R.A.M.C., had remained there till 4 o'clock on this Saturday afternoon; he had telephoned at 9.30 P.M. and been told that everything was in order; he was summoned by telephone at 10.40 and went immediately to the dispensary where he found Bird dead.

The inquest elicited the following evidence. The nurse gave Bird the phenol because she "thought it was the same thing as she had bought from a chemist at Preston and had taken herself." She was a V.A.D. with two years' experience in an emergency hospital; this included night duty for nine months during which she gave out medicines in accordance with doctors' prescriptions. She did not know the strength of the phenol, had not seen it given for a cold or as a gargle, and was unaware that it was used for sterilising instruments. No-one had warned her that the bottle was dangerous; the only label on it was the word "Phenol." The bottle was on the shelf; there were mixtures at one end of the shelf and liniments at the other. The corporal knew that phenol was dangerous and a poison; he had not included it among the dangerous drugs which were locked away under his charge in the medical inspection room. The coroner asked a medical witness whether he would expect phenol to be left out on a shelf available for nurses or anybody else to administer. The witness replied in the negative; but it is probably not the usual practice to lock up the disinfectants, constantly required for sterilising instruments and dressings, with those potent drugs, dangerous in small doses, which are intended to be taken by the mouth. According to the witnesses there was no general right to walk in and out of the dispensary unless on business, and no nurse had any authority to give medicine except under doctor's orders or on a prescription. The bottle had no corrugated sides to distinguish it as containing a poison, though there was some corrugation on the bottom.

The corporal said he had brought the bottle with him when he came to the post; he had no instructions about labelling poisons; he was not supplied with labels, but some had been obtained from an outside source. He was a Nursing Orderly, class 3, trained by the R.A.M.C. He seems to have had no responsibility for this regrettable incident. This was not a case of the absent-minded taking of one bottle in mistake for another; death was apparently due to a nurse not knowing that phenol is carbolic acid and is not intended to be administered to the patient by the mouth, whether for a cold or any other ailment. The coroner held that there had been negligence but not culpable negligence of a criminal kind. He thought that the attention of the highest authorities should be drawn to what had occurred.

Medical News

University of Cambridge

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B., B.CHIR.

Part I: Surgery, midwifery and gynæcology.—B. G. C. Ackner, V. R. Arulanandom, W. E. S. Bain, G. P. Baker, G. A. Barclay, J. A. V. Bates, W. J. M. Beveridge, J. A. Black, A. Bolton, P. F. Borrie, B. F. Brearley, M. M. Brown, C. D. Calnan, N. A. Campbell, P. W. S. Coghill, N. D. Compston, S. M. E. Cornes, J. W. A. Crabtree, E. G. A. Crawshaw, N. F. Crofts, M. C. Cross, G. E. L. Cummins, R. J. R. Cureton, R. E. Danckwerts, H. G. Danziger, G. H. Dhenin, R. Dobson, K. M. Duncan, P. D. Eeman, R. M. Emrys-Roberts, P. Eskell, G. E. Ffrench, T. N. Fison, J. B. Foote, D. G. R. Fox, A. C. Franks, F. S. Glassow, N. J. Goorney, J. A. B. Gray, G. F. Green, D. W. H. Griffiths, E. J. Harrison, E. J. Holborow, R. A. Holden, P. Hugh-Jones, A. Hulme, W. P. U. Jackson, M. R. Jeffrey, P. G. Jeffries, H. W. F. Jones, H. D. Juler, T. D. Kellock, D. E. R. Kelsey, J. M. S. Knott, H. M. Lawson, A. G. Leacock, K. T. Lockhart, H. E. Lockhart-Mummery, A. Lyell, M. L. Macalister, H. McColl, I. Macdonald, C. W. F. McKean, S. J. R. Macoun, H. G. McQuade, R. G. Mathers, L. H. H. May, R. H. Meara, R. G. Miller, C. R. Naish, J. F. Neil, D. A. H. O'Sullivan, R. A. Palmer, C. M. Phillips, J. S. Pippard, E. C. Poulton, J. R. K. Preedy, P. M. M. Pritchard, P. K. Renshaw, W. S. Rhodes, A. G. Richards, W. E. Roden, A. J. Rook, J. H. B. M. Rowlands, J. G. Salter, J. M. W. Sedgwick, P. B. Shaw, M. P. Sherwood, D. S. Short, E. G. Sita, J. F. P. Skrimshire, R. D. Slack, J. B. Stanton, M. G. P. Stoker, J. C. Swanson, R. D. Sweet, G. E. Thomas, E. G. Turner, E. Tylden, J. K. Wagstaff, R. J. Walker, J. C. Waterlow, R. B. Welbourn, B. C. Welshman, J. C. N. Westwood, G. Wetherley-Mein, R. H. Wheeler, R. U. Whitney, D. I. Williams, R. I. Williams, J. F. R. Withycombe, R. B. Wright, and J. B. Wyon.

University of Dublin

On Dec. 10, the following degrees were conferred at the school of physic, Trinity College:—

M.D.—Hyman Elliman, J. B. Fleming, Kenneth Watson, J. G. Waugh, and J. F. Wilde.

M.B., B.Ch., B.A.O.—N. J. Anderson, Emmeline P. Crowe, Margaret F. Y. Dixon, J. B. Dunlop, J. N. Greene, J. R. Hassard, T. L. Kelly, Ethna M. MacCarthy, A. J. B. McFarland, A. C. McReynolds, Kathleen M. J. Morphy, Jack Morris, J. A. Pearce, L. H. Shrago, J. P. Walsh, Dorothy H. Webster, and C. E. Williams.

Licence in medicine and in surgery and in obstetric science.—L. H. Citron.

University of Edinburgh

On Dec. 12, the following degrees and diplomas were conferred:—

M.D.—Fanny B. Chisholm, C. A. Gleadhill, A. M. MacDonald (gold medallist), *J. H. Patterson, *A. J. Rhodes.

D.Sc.—*C. E. van Rooyen.

M.B., Ch.B.—I. R. W. Alexander, R. F. Antonio, B. A. Bembridge, G. D. Bonner, William Boyd, A. K. Brown, L. F. Brown, W. J. J. Bryden, Rosemary E. Buchan, William Campbell, J. McD. Corston, John Devine, N. G. Douglas, N. K. Farley, W. D. Frew, E. R. L. Gregson, C. J. C. Hinnrichs, Jean Leith, Anne W. Maclennan, Dennis Malcolm, A. M. Plant, David Pottinger, S. I. Pugh, Anne R. McC. Ross, Margaret C. Tait, H. D. Thompson, D. R. Tipping, *Frederick Vicdge, A. L. Wallis, J. A, Watt, and D. B. Wiseman.

D.P.H.—*A. S. Qunta, T. M. Small, *Helena S. L. Taylor.

D.M.R.—R. A. McKail.

* In absentia.

The degrees conferred by the Polish School of Medicine were given in THE LANCET of Dec. 20 (p. 780).

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 16, with Mr. J. W. Struthers, the president, in the chair, the Liston Victoria jubilee prize for the greatest benefit done to practical surgery in the preceding four years was awarded to Prof. J. R. Learmonth for his contributions to the surgery of the autonomic nervous system; and to Dr. Robert McWhirter for his contributions to the radiotherapy of malignant disease.

The following were admitted to the fellowship:—

H. E. Blake, M.R.C.S., J. H. Brownlee, M.B. Edin., L. S. Corner, M.B. Sydney, W. B. S. Crawford, M.B. Belf., J. S. Davidson, M.B. Edin., C. W. A. Falconer, M.B. Edin., R. D. Ferris, M.B. Melb., J. D. T. Jones, M.B. Durh., A. R. Leask, M.R.C.S., F. R. Miller, M.B. N.Z., E. T. Owen, M.B. Lpool, Guy Rigby-Jones, M.B. Camb., M. V. Sheehan, M.B N.U.I., G. M. Sleggs, M.B. Lpool, G. C. Tweedie, M.B. Lpool, and P. J. M. Wright, M.B. Lond.

Royal Sanitary Institute

Dr. J. E. Gordon, professor of preventive medicine and hygiene at Harvard University, who is in charge of the American Red Cross Harvard Field Hospital in this country, has been elected an honorary fellow of the institute.

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American Honours

The American Congress of Physical Therapy has awarded a gold key to President Franklin D. Roosevelt, in appreciation of his long interest and support of the medical fight against infantile paralysis. Keys have also been given to Dr. William Bierman, attending physical therapist at Mt. Sinai hospital, New York; and to Lieut.-Colonel W. S. C. Copeman, honorary secretary of the British Rheumatism Association, in recognition of his development of a physical therapy organisation in the battle field.

The *Times* Picayune loving cup for 1940 has been presented to Dr. Rudolph Matas of New Orleans "in recognition of his years of unselfish service to his fellow men."

Billets for the Day

The Ministry of Health and the Board of Education have issued a joint circular (Nos. 2535 and 1573 of the respective ministries) advising local authorities how to speed up the provision of day nurseries and play centres for the children of women taking jobs. But it points out that the greatest contribution to the task of dealing with these children must come from the stay-at-home women of the district, who must divide between them the duty of looking after the children of those at work. The names of women willing to work if their children are cared for, and of women willing to share in the care of the children should be sent to the local authorities and, with the help of voluntary organisations, the two groups should be put in touch with each other and helped in making friendly arrangements about the children which may if they wish be extended to children of school age. The circular stresses that it is the duty of the welfare authority to set up a central office to act as a liaison between the mothers and the volunteers. No more than three children should be cared for in an ordinary working-class home and health visitors should pay special attention to these guest children. Probably the women will prefer to make their own arrangements about payment but if need be the Government are ready to offer financial help under the scheme of daily guardians which is being administered by the regional controllers of the Ministry of Labour. It is described in their leaflet (E.D.L. 67 revised). Forms of application for registration as a daily guardian can be obtained at the local office of the Ministry. In addition to whatever weekly sum the mother arranges to pay to the guardian herself the state will pay 4*s.* a week for each child under five cared for on four days or more, and 2*s.* a week for each child for less than four days. An application for this payment must be signed by both mother and guardian.

Public Health

From the Annual Reports

HENDON

HERE Dr. A. Fairgrieve Adamson reports an increase in infantile mortality from 34 to 54, largely due to high fatality from respiratory diseases, which was spread evenly throughout the year and not limited to the first quarter. Dr. Adamson says: "at no time were the shelters used to their full capacity, most persons preferring to remain in their own houses or to use shelters of the Anderson or other types." This seems to be usual in the towns of the outer ring of the metropolis.

BOOTLE

This county borough, according to Dr. F. T. H. Wood's report, had an estimated population of 67,760 in mid-1940, a reduction of 9010 from the 1931 census. In estimating civil populations, those in the services of the Crown are excluded, and since these now number several millions, all estimated civil populations are artificially lowered, and since men and women in the services are of ages at which death is exceptional all death-rates are artificially exalted. In Bootle the recorded death-rate was 17·3, against 12·4 in 1939, and the birth-rate 22·5, the highest rate since 1932, against the England and Wales rate of 14·6. Infantile mortality was 80 against 65 in 1939. The increase in infant deaths was mainly due to respiratory diseases in the first quarter of the year.

ILFRACOMBE

In contrast to these industrial cities Dr. D. C. Adam tells us that Ilfracombe had a birth-rate of 9·5, a corrected death-rate of 8·4, a tuberculosis mortality of 0·59 and an infantile mortality of 50. There was only one maternal death, but this gave a maternal mortality of 9·71. The estimated population was 10,160. There were 96 notifications of scarlet fever, which is high for such a small population, but there was no death from the disease. The negligible fatality of scarlet fever throughout the country since the start of the war is noteworthy.

STAFFORD

Dr. D. H. Binks in his report for this borough remarks that the corrected death-rate of 11·7 was above the ten years' average "probably due to the exclusion of the young members of both sexes who are now in the Services." There is another reason for an apparent rise in the death-rate which applies to all places which have been reception areas since the beginning of the war. The rate is in fact based on the mid-year population of 35,320. In the reception areas the numbers of evacuees steadily fell during the first part of 1940 when all was quiet but rose rapidly when the war spread to Britain, so the average population of the year was higher than the mid-year estimate. This makes all the vital-statistic rates based on the latter artificially high. Dr. Binks calls attention to the effect of the war on housing in reception areas—suppression of clearances and of building, and the temporary reconditioning of houses condemned or ready for condemnation. After the war the badly destroyed towns must have first claim on the building industry, but the state of the towns which have not suffered from air-raids must be kept in mind.

Infectious Disease in England and Wales

WEEK ENDED DEC. 6

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1324; whooping-cough, 1725; diphtheria, 1103; paratyphoid, 8; typhoid, 17; measles (excluding rubella), 667; pneumonia (primary or influenzal), 979; puerperal pyrexia, 178; cerebrospinal fever, 132; poliomyelitis, 14; encephalitis lethargica, 3; dysentery, 165; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 3 was 1346, including scarlet fever, 157; diphtheria 301; measles, 37; whooping-cough, 477; enteritis, 52; chicken-pox, 46; erysipelas, 33; mumps, 17; poliomyelitis, 5; dysentery, 8; cerebrospinal fever, 11; puerperal sepsis, 18; enteric fevers, 17; malaria, 1; other diseases (non-infectious), 76; not yet diagnosed, 90.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fevers, 1 (0) from measles, 6 (1) from whooping-cough, 27 (1) from diphtheria, 28 (1) from diarrhœa and enteritis under 2 years, and 29 (1) from influenza. The figures in parentheses are those for London itself.

Cardiff reported 1 death from an enteric fever.

The number of stillbirths notified during the week was 177 (corresponding to a rate of 37 per thousand total births), including 14 in London.

Births, Marriages and Deaths

BIRTHS

LIGHTWOOD.—On Dec. 19, at Gerrards Cross, Bucks, the wife of Dr. Reginald Lightwood—a son.

PARNELL.—On Dec. 15, in London, the wife of Dr. R. W. Parnell—a daughter.

SWAIN.—On Dec. 14, at St. Albans, the wife of Dr. R. H. A. Swain—a son.

MARRIAGES

CALDWELL—DUNBAR.—On Dec. 20, at Burnham, Bucks, Kenneth Peter Somerville Caldwell, M.B., to Dorothy Anderson Dunbar.

KEITH—PAKEMAN.—On Dec. 19, in London, John Stobart Keith to Evelyn May Pakeman, M.B.

STAFFORD-CLARK—STEWART.—On Dec. 16, at Mundham, Sussex, David Stafford-Clark, M.B., squadron-leader R.A.F.V.R., to Dorothy Stewart (*née* Crosley-Oldfield).

DEATHS

BEGG.—On Dec. 17, Alexander Clarke Begg, O.B.E., M.D. Edin., M.B. Lond., consulting physician to the Swansea Hospital.

FLEMMING.—On Dec. 19, at Upper Basildon, near Reading, Percy Flemming, M.D. Lond., F.R.C.S., aged 78

GRAY.—On Dec. 20, at Epsom, James Hugo Gray, M.D. Adelaide, professor of anatomy at St. Mary's Hospital, Paddington, aged 32.

HARRISSON.—On Dec. 15, at St. Neots, Hunts, Ernest Henry Harrisson, M.A., M.D. Camb., aged 64.

STABB.—On Dec. 19, at Torquay, E. Carthew Stabb, F.R.C.S., aged 78

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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Notes, Comments and Abstracts

TYNESIDE PROSPECT

IN the fifth reprint and second edition, since 1940, of his survey of social conditions on Tyneside,[1] Mr. D. M. Goodfellow, Ph.D., has done more than repeat the facts about high infant and tuberculosis death-rates, and the other penalties of the years of depression which make such bitter reading; he has added two new chapters about regional planning, and in doing so lays bare a tangle of conflicting values. The Royal Commission on Local Government found great disparity in the health services throughout the Tyneside area. Some of the poorest towns make the best efforts to improve their social services, though they can only do so by taxing their citizens and thus increasing poverty; some towns reach high standards in services which in a neighbouring town may hardly exist; and in many services the national standard is only reached in Newcastle itself. Thus the social services as a whole do not correspond to the needs of the area. To overcome such disparities the commission proposed the establishment of a new region, to consist of industrial Tyneside plus Northumberland county, and the formation of a new municipal borough to include the whole of industrial Tyneside. Dr. Goodfellow, though he favours the regional idea, insists that to believe the mere advent of regions would automatically solve all problems is a bad mistake. To weld Tyneside into one with the county might lead to over-emphasis on agricultural interests, and hence to disparities of social services within the region as wide as any now found on Tyneside. Moreover it would divide industrial Tyneside from its natural partner, Durham, with which it has close economic and cultural ties. The commission, indeed, suggested that the new region might later include Durham, but Dr. Goodfellow believes that it would be better if it did so from the start, if only because of Durham's considerable achievements in social services which would help to serve as a pattern and encouragement to Tyneside. The county of Durham is at once smaller than Northumberland and much more heavily industrialised; its inclusion in the region would not introduce the preponderance of agricultural interests to be feared from linking Tyneside only with Nurthumberland. The new Tyneside borough, in the view of the commission, should have powers corresponding to those exercised by a municipal borough. Thus it would have control of drainage, sewerage, street-scavenging, the inspection of slaughter-houses and the maintenance of minor roads, but it seems likely that the maternity and child-welfare services would come under the regional authority. There is a chance, Dr. Goodfellow believes, that such limited scope as these powers offer might fail to attract the right type of councillor. Housing, too, would be a special problem. Some Tyneside towns have attacked housing troubles with great tenacity and success in the past twenty-five years—Felling council, for example, have turned their overcrowded slum-ridden district into one of the best and most beautiful garden cities in the country. Councils which carry out big housing schemes become big landlords and big employers of labour and they have an important share in town planning and industrial development; citizens begin to visit the council offices to pay rents and discuss repairs, and thus get to know the officials and councillors. It seems to them proper that the council should control the schools, and they feel they have a personal share in their own schools and their own municipal housing. If a new great municipal borough is formed it will take over the council houses of all districts, and this keen sense of local responsibility will be lost. More disrupting still, housing will come under an authority which has no means of coördinating it with town and industrial planning, public-health services or education. It might be better, Dr. Goodfellow feels, to invest all powers in the regional authority, provided the region included both Northumberland and Durham with Tyneside in the middle. Such a north-eastern region could take united decisions on industrial planning and uniform development of social services on lines suited to both agricultural and industrial districts, and could ensure equitable treatment by the national exchequer. Moreover a really clever authority might find means to foster and maintain a sense of local responsibility among the citizens of its various districts, and that would be something new in large-scale local government.

1. Tyneside: The Social Facts. Newcastle-on-Tyne: Coöperative Printing Society. 1941. Pp. 100. 1s.

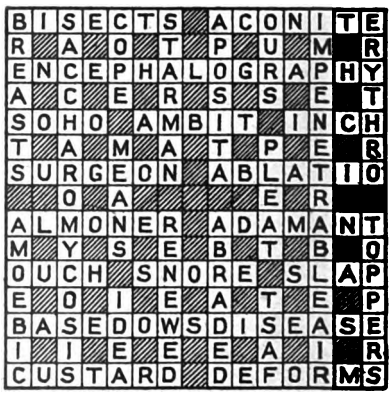
GOOD ENGLISH EARTH

Now that we must deck our table from our own fields, agriculture is coming into her own again; and long may we all enjoy it. She has been a struggling industry too long. *England and the Farmer* (Editor: H. J. MASSINGHAM. London: B. T. Batsford. Pp. 152. 10*s*. 6*d*.), a timely symposium of authoritative opinion, deserves to be widely read and pondered. In a vigorous introduction, Mr. Massingham pleads for a return to the small mixed farm, to farming for subsistence rather than, by a prostitution of scientific knowledge, for big profits. This note is stressed by other writers, notably Dr. L. J. Picton in his provocative article on diet and farming in which he contrasts the difference between the food produced by the sea and the land. The sea is self-manuring. "All the wastes of the sea remain in the sea. . . . Its cycle of fertility is established . . . and its by-product is vigour"; but food from the land nowadays is largely produced by means of chemical applications with consequent loss of quality and a vast legacy of defective nutrition and subnormal health. There is a quiet dignity about this book, and the many beautiful photographs enhance its charm.

MEDICAL DIRECTORY FOR 1942

PUNCTUAL as ever in its appearance the new directory contains 65,394 names, being 1090 more than in the 1941 issue. It is easy to believe that 300 fewer doctors are living in London, not so easy to guess the significance of 500 more names in the Scots and Irish sections. But we must not in these days inquire too closely where our colleagues are working; we must try to be content with having at all events an up-to-date box number. Other signs of the times are the occasional heading "emergency hospital," and the list of 962 temporarily registered practitioners (not included in the figures already given). Among the universities from which these have qualified, to mention a selection from the first column, are Bratislava, Toronto, Oklahoma, Cracow, Prague, Vermont, Würzburg, Lwow, Ohio, Vienna, Warsaw, Berlin. Medicine indeed has joined hands across the world. With sympathetic regret we note that the resetting in new and clearer type has made no further advance. The price of the directory remains at 63*s*., from J. & A. Churchill.

TRIOFAX TRIPLE DYE JELLY, issued by Burroughs Wellcome and Co. in collapsible tubes, contains gentian violet, brilliant green and euflavine, incorporated in a stable water-soluble jelly. It is intended for application to burns, especially of the hand and face.



SOLUTION OF LAST WEEK'S CROSSWORD PUZZLE

Appointments

CARGILL, W. P., M.B. Manc., D.P.H.: deputy M.O.H. for Southampton.

D'AMIAN, ELSE, M.D., L.R.C.P.E.: part-time assist. M.O. for Swinton and Pendlebury.

GAMGEE, KATHERINE, M. L., M.R.C.S., D.P.H.: asst. M.O.H. (maternity and child welfare) for Middlesbrough.

JONES, OLWEN, M.B. Lond.: medical registrar at the Royal Free Hospital.

ROBERTS, G. I., M.B. Lpool: R.S.O. at the municipal accident unit, Cardiff.

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Readers in search of a given subject will find it useful to bear in mind that the references are in several cases distributed under two or more separate but nearly synonymous headings. Institutions and Corporations with the right to the prefix Royal will be found under that prefix, with the exception of Hospitals, which will be found under that heading; and Medical Societies, which are separately indexed under Societies. All Universities are indexed under the word University. (*A*) = *Annotation*, (*C*) = *Correspondence*, (*LA*) = *Leading Article*, (*ML*) = *Medico-legal*, (*NI*) = *New Invention*, (*O*) = *Obituary*, (*P*) = *Parliament*, (*PP*) = *Panel Practice and* (*R*) = *Review*.

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